EDITORIAL

The Price Reductions

NOW that the wave of price reductions is about over it is possible to appraise the effect of the revisions. Among the conclusions to be drawn from such an appraisal are the following:

1—There has been little change in the relative competitive positions, viewed from the standpoint of prices, of the various manufacturers making reductions.

2—The major reductions have been on the closed models, open car prices having been affected but little.

3—The range between the lowest and highest priced models has been reduced in most cases.

4—The differential between touring car and the lowest price 4-5 passenger closed model, styled variously by the different manufactures as coach, brougham, two-door sedan, etc., has been substantially diminished.

Thus, it appears, the current price reductions have continued the trends which have been operating for the last year or so in the industry. The present drops do not constitute a change in tendencies, but a continuation of those already started some time ago.

Body Names

PROBABLY in no phase of its standardization work has the Society of Automotive Engineers met with more difficulties than in the matter of body nomenclature. The salesmanager has so large a finger in the model-naming pie that the engineer often has difficulty in stating clearly a technical viewpoint what is meant by a particular body designation.

When the type of car usually called a coach came into being no attempt was made to provide a special term for it in the S.A.E. standard nomenclature because to quote the *Journal*, the standard nomenclature is intended to apply to the basic types of body and variations of such basic types should include the basic name properly qualified." Thus the model called a coach, in S.A.E. nomenclature should be called a five-passenger coupe or a two-door sedan.

To find out just how the situation stands the engineers are conducting a survey among car manufacturers to learn exactly what terminology is applied to models of the coach or brougham variety. Changes in the standard nomenclature may be found necessary as a result of this survey.

For the past three years, S.A.E. nomenclature as regards bodies of this type has not been in accord with general conversational practice in the industry. On the other hand a trend seems to have started in certain quarters to give the "coach" some other name, partly because the lowest priced closed job today is something really superior to the original models designated as "coaches." Consequently, the decision not to include the word "coach" in standard nomenclature seems to have been thoroughly sound.

Joint Warehousing Coming

JOINT warehousing of non-competitive lines of a similar nature in large distribution centers, with one sales force handling the lines in the distributive territory, is a development that may be expected within the very near future especially in parts accessory lines. So large a percentage of costs has gone into freight and selling that such a move is almost imperative.

Both carrying and selling expense are reduced to the minimum by this system, and immediate shipments to wholesalers throughout the territory covered may be made from warehouse stocks almost overnight, even though the territory is a thousand or more miles away from the manufacturing source of supply.

This system is peculiarly adapted to reducing selling costs in the accessory and replacement parts field, and it is in these lines that developments may first be expected.

One group of manufacturers already has plans under consideration for establishing the first joint warehousing and sales organization of this sort and future developments will be watched with interest, both by manufacturers and the trade generally.

Concrete Roads in England

ENGLAND has not as yet taken very heavily to concrete roads. At the first of this year there was only 250 miles of such road in the whole of Great Britain. Proponents of other types of roads there have suggested that concrete construction has been losing popularity in the United States, but the figures do not sustain this view.

In 1922 contracts were placed in this country for concrete roads, streets and alleys to the extent of 40,559,281 square yards. In 1923 the total dropped to 33,250,000 square yards. In 1924 construction was again more nearly in pace with 1922, and this year will see more concrete used for roads than ever before, contracts having been placed for 51,080,153 square yards during the first five months. Against England's 250 miles we were able to boast 32,000 miles of concrete highway on Dec. 31, 1924.

Our Industry Today

August Sales and Production at High Level—Survey Shows Favorable Prospects in Most Sections

NEW YORK, Sept. 2—Basically sound conditions favor the automobile and allied industries at the outset of the fall season. August sales and production did not quite come up to earlier optimistic predictions, but nevertheless a satisfactory volume of business was done. Production totals for the month should be slightly below July, but will be less than the normal seasonal decline. July output was a record for that month.

It is likely that the trend of production will continue downward but the outlook is that September will not be far below August. Conditions last month were disturbed by the introduction of new models, and while these achieved in most instances the expected results in sales and inquiries, the full effect was not immediately felt, as some of the factories were unable to reach production in sufficient volume to satisfy the requirements of their distributors and dealers, and as many prospective buyers, especially those with trades to make, were slow in closing transactions. September business may be expected to benefit from this condition.

Fall Sales' Outlook Good

Sectional trade reports vary as to the degree of optimism expressed, but an overwhelming majority, even where disappointing conditions during August are found, evidence the confidence of local tradesmen that Fall sales should hold to a good level. The soundness of the industry is shown in the prevailing low stocks of both new and used cars, as well as tires and other accessories and equipment.

Prosperous agricultural conditions are strong factors, especially in the Middle West, where farmers are buying cars on an unusually generous scale. The industrial sections also report good business, but weak spots have developed in the mining districts of the East and in Colorado. Threats of strikes have had the usual reaction on automotive buying.

A stabilizing factor last week was the announcement of new Ford models. It had been widely feared that Ford would cut prices, which would have affected directly or indirectly most of the companies in the business, and both factories and distributing organizations can now proceed with renewed confidence, with an important element of uncertainty removed. Nobody denies, however, that competition is on an unparalleled level of intensity, and only those companies manufacturing wholesale and retail that display the highest quality of sales ability will have a profitable fall and winter season.

The effect of tire price advances is being felt in various ways. On the one hand, sales are not as brisk as might

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Purchase of Austin Up to Stockholders

General Motors First United States Manufacturer to Obtain Light Foreign Car

DETROIT, Sept. 1—The offer of General Motors Corp. to purchase Austin Motors, Ltd., of England, announced in AUTOMOTIVE INDUSTRIES last week, has been accepted by the directors of the British company and now awaits the favorable action of its stockholders. This information is contained in an official statement issued here by Alfred P. Sloan, Jr., President, General Motors Corp.

The British assembly operations of General Motors, now located at Hendon, near London, will be consolidated with the production of the Austin plant at Birmingham, Mr. Sloan's announcement states.

Austin's Post-War Growth

The Austin company, which is about to come under American control, has been in existence for nearly a quarter of a century, but attained its major growth during and after the World War. During the war, Austin Motors, Ltd., was prominent in the manufacture of airplanes and munitions. It developed so high an efficiency in this work as to receive official commendation from the House of Commons.

While never an extremely large producer, the output of Austin Motors, Ltd., grew after the announcement of the Austin Twenty in 1919. The present Austin line consists of a 12 h.p. model at £355, a 7 h.p. model at £149 and the 20 h.p. car at £525.

The 7 h.p. car is the latest development of the company, having been put on the market in 1924. It has novel design features, including a frameless body. It is fitted with four-wheel brakes and has a body capable of carrying four passengrs, but its wheelbase is only 75 inches, while its four-cylinder engine has a bore and stroke of 2.2 by 3 in. and a displacement of only 45 cu. in.

The Austin company has a capital of over £3,000,000 and has debentures outstanding amounting to about £1,000,000. The company experienced heavy losses in 1920 and 1921 when there was a very general depression in automobile markets, but its last financial report showed an estimated gross profit of £470,000 for the year ended September 30, 1924. Austin common stock of £1 par value is being quoted now around 7 shillings, while its preferred stock of £1 par value is being quoted at 17 shillings. Austin debenture bonds of £100 par value are selling around 94 at present.

No announcement concerning the administrative personnel of the British company under its new ownership is to be expected until after the purchase has been approved by the stockholders.

Adds Strength Overseas

"Through the coordination and with the addition of the Austin car to the General Motors line, the position of General Motors in Great Britain and in other overseas countries, particularly those under the British sphere of influence, will be materially strengthened," Mr. Sloan states.

By acquiring the Austin products, General Motors will be the first large American manufacturer to have a light car of European characteristics for sale in foreign markets. General Motors already has thousands of sales outlets throughout the world and is constantly increasing its foreign representation. Consequently, it would seem to be in a position to put behind the sale of a light car more merchandising strength than ever has been available for cars of that type up to the present time.

N. A. D. A. Announces More Sales Meetings

ST. LOUIS, Sept. 8—The National Automobile Dealers Association announces these sales congresses for October, November and December:

October—1, Providence, R. I.; 2, Springfield and Worcester, Mass.; 5, Northampton and Pittsfield; 6, Troy and Glens Falls, N. Y.; 8. Oswego and Watertown; 9, Auburn and Ithaca; 19, Wheeling, W. Va.; 20, Clarksburg and Charleston; 21, Roanoke and Lynchburg; 22, Washington; 23, Richmond and Norfolk; 27, Charlotte; 28, Savannah and Columbia; 29, Jacksonville; 30, Miami and Tampa.

November—3, Atlanta; 4, Birmingham; 5, Mobile; 6, New Orleans; 9, Houston; 10, Dallas; 11, Fort Worth and Waco; 12, San Antonio; 16, El Paso; 17, Phoenix and Douglas; 19, San Diego and Riverside; 20, Pasadena and Glendale; 23, Long Beach, Cal., and Hollywood; 24, Santa Anna and Pomona.

N. A. C. C. Production Showed August Gain

Chamber Members Made 11 Per Cent More Vehicles Than in July

NEW YORK, Sept. 2—Preliminary estimates of August production of cars and trucks, made yesterday at a meeting of the board of directors of the National Automobile Chamber of Commerce, indicate that the totals for the chamber members will run about 11 per cent over the July figures and 74 per cent over August of a year ago. When Ford production is included, however, the total may be slightly below the July mark this year. The meeting was held at Blind Brook Country Club, Portchester, N. Y., and was followed by a dinner given by A. J. Brosseau, president of Mack Trucks, Inc.

The trade outlook was reported as good, with stocks in dealers' hands lower than normal for the season and with exports constantly increasing. John N. Willys reported on the foreign situation and it was decided to broaden the activities of the chamber's foreign trade committee.

The appointment of a committee was authorized with a view to considering plans for better schools for mechanics, with curricula to be drawn up by the N. A. C. C.

A preliminary meeting of the insurance committee was held, and a survey program laid out. Another meeting will be held in about 30 days, when, it is expected, the necessary data will have been collected. On the committee are A. R. Erskine, Roy D. Chapin, R. E. Olds, Windsor T. White, William E. Metzger, Clifford B. Longley and Arthur T. Waterfall.

Rickenbacker Sees Small Car Popular

ST. LOUIS, Sept. 2—What of the motor car of the future? Capt. E. V. Rickenbacker, vice-president of the Rickenbacker Automobile Co., was asked on his visit to St. Louis last week to help launch the Rickenbacker St. Louis Co., new distributors of the Rickenbacker car in St. Louis territory.

"Well," said Rickenbacker, "first you must bear in mind how rapidly we are building more and better roads, and how congestion and traffic problems are multiplying. There is no longer any reason why an automobile should take up the space used by 20 people to carry an average of three. Therefore, it is obvious that cars must grow smaller, shorter, lighter and more economical of gasoline and oil. Engines must become steadily smaller and more efficient.

"What I am now going to say is in no sense a foreshadowing of the Rickenbacker factory plans. It is merely an attempt to visualize the car that is to come in the next five or ten years.

"I believe that springs will be eliminated, as also will be the overhang of a car front and rear.

"There are two sources of riding comfort—natural and mechanical. The natural source is air, the mechanical is springs. Air is the proper cushion for an automobile, not springs. We have good roads that are growing better, and balloon tires. Why not center our efforts for comfort in the balloon tire? Why not make it bigger in cross section and smaller in diameter? This would mean doing away with wheels, which would become drums for the brakes. With the roads we will have in five or ten years, road clearance of four inches or so will be sufficient, making the small thick balloons practicable. Then the frame can be hung directly from the axles.

"The body can be built out so as to overhang these small tires, and the tread can be narrowed to, say, 40 to 46 inches, and still the car can carry as many passengers as the large cars of today.

"The trend toward such cars, it seems to me, is natural, being forced by the logic of events. The number of cars operating over our roads is rapidly increasing. It is entirely possible that some day we may have as many as 30,000,000 of them. This will mean more roads, increased property values, greater congestion in population centers, larger consumption of gasoline and oil. Space and expense must be economized.

"The demand for small, compact, economically operated cars is beginning to be felt. It will be felt with increasing strength until it has resulted in a complete change in automobiles."

CADILLAC OUTPUT HEAVY

DETROIT, Sept. 1—In the first three weeks of August, the sale of the various Cadillac models was 51 per cent greater than for the first three weeks following their announcement, according to Lynn McNaughton, vice-president and sales manager. They were also 70 per cent greater than for the same period of 1924.

The present weeks as regards production are the largest in the history of the company, the big plant here working night and day in an effort to catch up on the orders that have been taken since the new models made their appearance.

CHRYSLER MAKING RECORDS

DETROIT, Sept. 1—Production at the Chrysler factory on both fours and sixes is the largest in the history of the company, company officials have announced. The ratio is about two to one for fours as against sixes.

For the past week over 800 cars have been turned out at the two plants here, the division being on the average of 550 fours to 250 sixes. Not all the cars being produced are being turned toward new orders but to take care of the unfilled orders that have accumulated on the books of various dealers.

Detroit Body Plant Bought by Chrysler

Factory of American Motor Body Co. Has 700,000 Square Feet

NEW YORK, Sept. 3—The purchase of the Detroit property and plant of the American Motor Body Co. by the Chrysler Corp. was announced today by Walter P. Chrysler, president. "Because of the present inability of the Chrysler Corp. with its various plants to keep anywhere near the demand for Chrysler six and four-cylinder cars, the Chrysler Corp. has purchased the Detroit plant of the American Motor Body Co., which will give the Chrysler Corp. 700,000 sq. ft. of additional space," said Mr. Chrysler.

"The first and second floors of the new plant will be used for general manufacturing purposes by the Chrysler Corp., and the other floors will be used for building open cars, including Chrysler four-cylinder touring cars and six-cylinder phaetons and roadsters.

Stops Body Shortage

"During the past year the Chrysler Corp. experienced body shortage on several occasions with a consequent unavoidable slowing-up of production. With the new plant, which is regarded as one of the finest body plants in America and directly across the street from the Jefferson Avenue plant of the Chrysler Corp., we are assured of an adequate supply of quality bodies. The purchase of this plant is simply assurance for the future. It will make certain our ability to meet the demands for the Chrysler cars."

The Chrysler Corp. has arranged to take over contracts for bodies made for other motor car companies. The amount of the purchase price was not announced.

FRANKLIN CAR CUTS

SYRACUSE, Sept. 1—The H. H. Franklin Automobile Co. has announced the following price reductions:

Model	New price	Old price
Sport Roadster	$2,750	$2,800
Touring	2,635	2,650
Sedan	3,090	3,200
Sport Sedan	3,225	3,350
Limousine	3,275	3,500

GENERAL MOTORS OVERSEAS

NEW YORK, Sept. 2—The overseas sales of General Motors in the six months ended June 30, 1925, totaled 41,732 cars, as compared with 33,956 cars in the corresponding period of 1924. These figures include the sales by General Motors Export Co. to overseas distributors and dealers and sales by the overseas assembly plant of General Motors.

Sheet Market Prices Show Stiffer Tone

Automotive Orders Numerous, but Not Large Enough to Stir Competition

NEW YORK, Sept. 2—The slightly stiffer tone of the sheet market results largely from the sentimental effect which somewhat more full prices for galvanized sheets have on other descriptions of sheets. The zinc market, although it eased off fractionally last week, has been a source of worry to galvanizers of late, and, pointing out that they are now paying ½c. per pound more for zinc than they did earlier in the summer, they have been able to avoid concessions, even if they have so far been unable to bring about actual advances. Buyers of black and full-finished automobile sheets continue, however, to resist successfully price advances for those descriptions. There have even been reports lately of a Mahoning Valley sheet mill being able to obtain sheet bars at a cut under the $35 level, which is the generally prevailing quotation, and which undoubtedly is being adhered to by most of the semi-finished producers. The alternative to higher sheet prices for the non-integrated rollers is a lower price for their semi-finished material, and in all probability, if sheet prices cannot be lifted higher, that for sheet bars will give way, although quite frequently in the past the price for sheet bars has been artificially held for some time at a higher level than sheet market conditions warranted.

Automotive Specialties Strong

While the market for alloy automotive steels is a shade easier, due to the keen competition for what business overhangs the market, such automotive specialties as cold-rolled strip steel and cold-finished bars continue to meet with sufficiently good demand to maintain previously prevailing price levels. In a large measure, this is due to the fact that, while automotive orders are numerous, none calls for sufficiently large tonnages to engender spirited competition among producers.

Materialization of the anthracite coal miners' strike has brought about in the steel market a feeling of optimistic uncertainty. Sentiment inclines to the belief that, if the atmosphere is cleared in this key industry, steel producers may possibly address themselves to a task which time and again since the war has been deferred, liquidation of unnecessarily high wage scales.

Pig Iron Prices Maintained

Although demand continues very light, prices for pig iron are being well maintained, largely because blast furnace interests recognize that concessions at this time would hardly stimulate the demand sufficiently to warrant such a step. Automotive foundries are buying in a routine way.

Aluminum. — Automotive consumers are covering their wants by contract or otherwise, and fresh developments in this situation are totally lacking. Prices for both virgin and secondary metal are well maintained, and a good deal of low grade secondary or remelted metal moves into parts, such as passenger motor car steps, etc.

Copper.—As usual in an advancing copper market, the red metal had to face a bear attack in London, largely engineered by German interests. Producers, however, are confident that the 15c. level will be reconquered. Automotive buying of brass and copper products is of good volume.

Tin.—The metal's unfavorable statistical position is believed to have been fully discounted, and slight gains would not come as a surprise.

Lead.—The "outside" market is now showing signs that the worst of the famine period has been passed.

Position of Wickwire Spencer Steel Co.

NEW YORK, N. Y., Sept. 2—The Wickwire Spencer Steel Co.'s $10,807,500 prior lien collateral and refunding mortgage 7 per cent convertible sinking fund gold bonds, Series "A," due Jan. 1, 1935, have been admitted to listing on the New York Stock Exchange. The company's income account for the six months ended June 30, 1925, together with comparative figures for 1924, follows:

	Six Months Ended June 30, 1925	Six Months Ended Dec. 31, 1924
Current Assets:		
Cash	$1,204,307	$1,542,668
Notes and accts. received	1,552,398	2,106,415
Inventories	5,543,678	7,275,098
Total current assets	$8,300,423	$10,924,181
Current Liabilities:		
Accts. pay. and accruals	$841,506	$1,434,547

Net sales for the six months ended June 30, 1925, was $9,448,545, and total income was $1,052,151.

PLANT ADDITION PLANNED

MILWAUKEE, WIS., Sept. 2—The A. O. Smith Corp., manufacturers of pressed steel frames and forged and pressed steel parts, has let contracts for the construction of a $350,000 plant addition. The corporation has recently perfected and is putting into production a new type of still for the manufacture of gasoline and by-products from crude oil. It is also engaged in the quantity manufacture of casing couplings for pipe line joints and refinery vessels. These involve the use of a new welding process recently developed, which possesses unusual merits, it is said, in withstanding high pressure.

MANUFACTURING ADDITION

MILWAUKEE, WIS., Sept. 2—The Standard Sheet Metal Works, which specializes in the manufacture of garage units, has begun the erection of a manufacturing addition to its plant.

Level Line of Car Production Needed

A. P. Sloan, Jr., Outlines Policy in Message Addressed to Dealers

NEW YORK, Sept. 2—Alfred P. Sloan, Jr., President of the General Motors Corp., in a message to dealers, takes up the problem which confronts every automobile manufacturer, namely, that of the regulation of the flow of cars to the consuming public.

Figures showing the percentages of the year's deliveries by General Motors to consumers, by months, are as follows:

January	4.86	July	7.11
February	5.15	August	4.25
March	11.75	September	6.96
April	14.70	October	7.60
May	13.50	November	6.94
June	11.68	December	5.50

From this table, it is seen that a much greater number of cars must be available for retail distribution at certain times of the year than at others, Mr. Sloan points out. Yet it is impractical to vary production schedules to as great an extent as would be necessary to keep in line with seasonal variations.

Better Product, Lower Cost

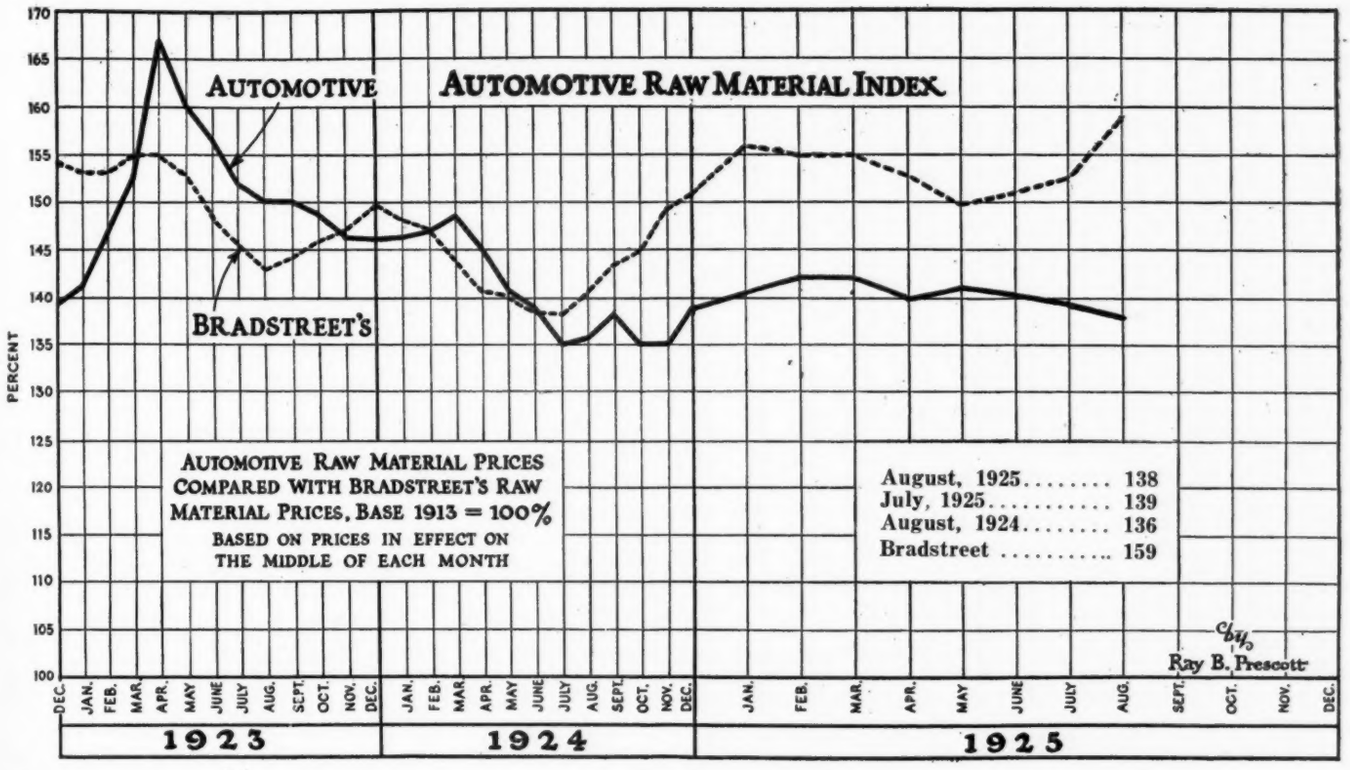
The nearer a factory can approach a level line of production, Mr. Sloan believes, the more economic the general result will be. This means not ony a better products, but a lower cost, with a resulting lower list price. Production schedules, therefore, should be laid down, always bearing this in mind, and should be promptly adjusted whenever the trend of retail sales indicates the necessity for such adjustment, in order that the stock to be carried by the distributors and dealers shall not be either greater or less than the economic necessities of the situation require.

From this outline of General Motors policies, it is seen that distributors, dealers and the factory's own branches must carry stock at certain seasons if it is going to be possible to meet the seasonal peak of retail demand, Mr. Sloan concludes.

GRAHAM TRUCKS MAKE RECORD

DETROIT, MICH., Sept. 2—Official figures have been released showing that 10,800 Graham Bros. trucks were shipped in the first half of 1925. This equals the entire 1924 output. The daily production of this company's trucks is 40 per cent higher at present than in January, and, according to factory officials, is being further increased to supply the demand. Retail deliveries in June and July held up to the record deliveries established in March and April. The 1922 sales of these trucks exceeded the 1921 sales by 154 per cent; the 1923 sales were 105 per cent greater than those in 1922, and 1924 forged ahead of 1923 by 54 per cent.

Raw Material Prices Continue to Decline



Packard Pays Off All Preferred Stock

DETROIT, MICH., Sept. 1—The Packard Motor Car Co. announces the distribution of $7,282,440 to its preferred stockholders to retire, at 110 the entire issue of preferred stock of the company. With the retirement of this stock, the company announces that it has no outstanding securities, save common stock, and no obligations other than current liabilities on the company's books. After paying off the preferred stock, the company has on hand approximately $14,500,000 in cash and marketable securities, and all future earnings will be available for payment of common stock dividends. In the last four years, the Packard Company announces that it has paid off $11,000,000 in bank obligations, and has paid off and retired $15,500,000 of outstanding preferred stock.

Eaton Axle and Spring Has Five-Year Contract

CLEVELAND, OHIO, Aug. 27—Announcement was made today that the Eaton Axle & Spring Co. had closed a five-year axle contract which will run between $3,000,000 and $5,000,000 a year. It was not announced with whom the contract was made, but it is reported to be a company that had not purchased axles of Eaton heretofore. It is understood that terms of the contract will be very profitable, and the company expects to get into production on the order in December.

J. O. Eaton, chairman of the Eaton Axle Co., said that the company's axle division has been running practically full time with one shift employed. The spring and bumper units are busy and it was reported that the company is doing a large jobbing business in these departments. The company has gone through the peak of the year's business without resorting to bank borrowing and has increased its cash.

Marlin-Rockwell Corp. Acquires Strom Co.

NEW YORK, N. Y., Sept. 2—Reports that the Marlin-Rockwell Corp. had purchased the plant, property and good will of the Strom Ball Bearing Mfg. Co. have been confirmed. The business of the latter company will be conducted exactly as heretofore, under the direction of the same personnel and department heads. There will be no change in policy and the same lines of bearings under the Strom trade name will be continued.

Common Stock Increased

At a special meeting of the Marlin-Rockwell Corp. stockholders approved an increase in the common stock from 222,850 to 300,000 shares. The New York Curb ruled that rights might be dealt in on a "when issued" basis on and after Aug. 20, and that they must be settled Sept. 8. Directors of the company have offered common stockholders of record Aug. 28 the right to subscribe to new stock at $15 a share in the ratio of 15 per cent of their holdings. Subscriptions must be payable in full on or before Sept. 14.

Chrysler Preferred Dividend Declared

NEW YORK, Sept. 2—The Chrysler Corp. has declared the regular quarterly dividend of $2 a share on the preferred stock for the third quarter of this year, payable Oct. 26 to holders of record of Oct. 10.

The following statement was issued in conection with the dividend declaration:

"Shipments for August are running 50 per cent ahead of those for July and will total over 18,000 cars for the month. Orders on hand represent 60 days' business at the current rate of production. Chrysler cars are now being sold to a dealer organization numbering over 3800, nearly double the number of active dealers of a year ago. The increase of export business is a striking feature of the corporation's development. Export business this year to date has attained a volume of $8,500,000, and promises to become an increasingly important factor in the corporation's business."

REMY ELECTRIC ADDS EMPLOYEES

ANDERSON, IND., Sept. 2—The Remy Electric Co. last week increased its working force to 3900 persons, the largest number of employees it has had in five years. Prospects for late summer and early fall activity are bright, according to general manager C. E. Wilson. It is understood that developments are expected which may add to the plant and the employment rolls and considerably increase the industrial importance of this unit.

Tire Company Profits Ahead of Last Year

Earnings for First Eight Months of 1925 Exceed Total for 1924

AKRON, OHIO, Sept. 2—Earnings of the leading tire and rubber companies in the first eight months of the year already have exceeded those of the entire year 1924. For this reason, business in the last four months of 1925 could fall off 50 per cent or more and still run far ahead of the previous year.

Authorities in the industry, such as E. G. Wilmer, Chairman of the Board of the Goodyear Tire & Rubber Co., and B. G. Work, President of the B. F. Goodrich Co., express the opinion that business of the rubber companies in the last half of the year will be less than it was in the first half. There is certain to be a sufficient return, however, to bring this year's total income of the well-established concerns considerably above that of 1924, which means that 1925 will be the best year the industry has enjoyed since the depression of 1920.

On the basis of business in July and August, the majority of rubber and tire companies probably will report sales and earnings during the third quarter almost as large as, if not equal to, the record-breaking second quarter.

Original equipment business, which declined somewhat in July and the first part of August, is showing an increase, due to greater sales of new automobiles, following announcements of price cuts and the bringing out of new models.

One of the most profitable sources of business for the tire companies at present is the sale of bus and truck tires. Owing to the many new bus lines, placed in operation by individual corporations, as well as street railway and railroad companies, most observers see a growing demand for tires from these sources for years to come. It will be a long time before there is talk of a saturation point in this field. While unit sales of bus and truck tires do not appear so large, the business in dollars is reaching huge proportions. One heavy duty tire of this kind costs from twenty to forty times as much as an ordinary Ford-size casing.

Car Makers Greet Sir Henry Maybury

NEW YORK, Sept. 3—Roy D. Chapin, chairman of the Highways Committee of the National Automobile Chamber of Commerce, was host at a dinner in the Ritz-Carlton Hotel last night in honor of Sir Henry Maybury, Director General of Roads of Great Britain, and the members of the U. S. Mission who are sailing today to attend the Pan-American Road Congress in Buenos Aires.

In an informal address the British road official made some interesting observations on the status of the automobile in England at the present time.

"Of all industries in the country," he said, "that represented by the motor vehicle is the only one showing any signs of prosperity. Since the War we have been a very poor nation. We are weighted down by taxes. But still, a comparatively large number of people find ways of financing the purchase of automobiles. I am convinced that one reason for this is found in the falling off of beer and liquor consumption. Our people face two desires—on one hand, they like to drink; on the other, they like to ride, to spend their holidays in automobiles. The automobile is winning out. They can't afford to both drink and ride, so they are foregoing the drink.

Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, spoke to the gathering on International Highway Transport Relations.

Trent Rubber Plant to Be Sold Sept. 11

TRENTON, N. J., Sept. 2 — Charles F. McCoy, receiver for the Trent Rubber Co., will offer the plant and equipment for sale on Sept. 11. There are two mortgages for $110,000 on the property. The plant failed some time ago and Federal Judge Bodine ordered Mr. McCoy to sell it. The plant was erected a few years ago.

The plant and equipment of the Bergougnan Rubber Co. was again put up for sale on Aug. 25, but there were no bidders and the sale went over.

FACTORY ON OVERTIME

WALPOLE, MASS., Sept. 2 — The Multibestos Co., manufacturers of brake, clutch and transmission linings, report on summer business as follows:

Contrary to our practice for the past two years, it is necessary that we maintain full production in all departments for the entire month of August. It has been our custom to close the plant for a vacation period the last two weeks in August. For 1925, such a procedure is out of the question and in addition to full day schedules, we are now running the yarn-making and weaving departments on night schedules of thirteen hours five nights per week with considerable overtime in other departments.

NEW GERMAN TARIFF CHANGES

WASHINGTON, D. C., Sept. 2—Automotive products are among those American export items which will be chiefly affected by the recent passage of the general tariff bill in the Reichstag, according to dispatches received here from Commercial Attache C. E. Herring, Berlin, Germany. The new duties are effective Oct. 1, and it is assumed that this action by the Reichstag means the lifting or abolition of the import permit system on that date.

July Motor Exports 13.1% Under June

Passenger Cars Show Decrease, While Sales of Trucks and Cheap Cars Climb

WASHINGTON, Sept. 3—Automotive products to the value of $22,948,795 were exported by the United States in July, while Canada shipped $2,268,703 worth in the same period, it is announced here by the Automotive Division of the Department of Commerce. This total figure represented a 13.1 per cent decline from the export value of American automotive products exported in June.

"Whereas exports of passenger cars both from the United States and Canada decreased from 22,121 units in June to 19,568 in July, in response to seasonal influences," the Division points out, "the export trade in trucks was not so affected. Although Canada failed slightly to attain its June export figure for truck exports, the United States improved its trade by 38.6 per cent over the previous month in this line. In production it is interesting to note that the same tendency was carried out, as July output was in excess of that for June only in respect of trucks made in the United States. This would indicate that domestic as well as foreign demand for commercial transportation did not experience a July slump."

Foreign assemblies in July totaled 16,194, as compared with 16,839 for June. Their decline in this month, as well as their trend in recent months, quite closely parallels the movement in export shipments of passenger cars and trucks (complete and chassis) during these same periods. However, these assemblies, when combined with regular exports, continue to represent more than 10 per cent of the total car and truck production in the United States and Canada.

Passenger cars, in the class "Valued up to $500," and commercial cars, valued up to $800, were largely responsible for keeping July exports of all passenger cars and trucks from the United States at a relatively high figure. Whereas shipments of medium and high-priced cars fell off considerably in every class in July as compared with June, the demand for low-priced cars was very firm, being only short of that prevailing in May when 8542 cars of this price class were exported. In the truck field there was better export business, not only in the lightest delivery-wagon type, but a marked improvement was also noted in those trucks which range in capacity from 1 to 2½ tons.

BATES MACHINERY DIVIDEND

JOLIET, ILL., Aug. 31—A dividend of approximately 16 cents on the dollar has been allowed unsecured creditors of the Bates Machinery & Tractor Co.

Men of the Industry and What They Are Doing

U. S. Motor Truck Changes

Andre Graf, formerly Assistant Chief Engineer of the United States Motor Truck Co. of Cincinnati, has been appointed Chief Engineer, succeeding E. C. Shumard. This concern has appointed L. A. Poundstone, formerly with the Service Motor Truck and Autocar Companies, Eastern Division Sales Manager for Western New York, Western Pennsylvania and part of West Virginia. Bert E. Handel, formerly with the Gary Co., has been named Division Sales Manager for Illinois and Indiana. E. T. Herbig, General Sales Manager, also announces the appointment of C. H. Gierhart, formerly with the Gramm-Bernstein Co., as Division Sales Manager for part of West Virginia, Southern Ohio and Eastern Kentucky.

Jandus Is Promoted

H. S. Jandus has been promoted to the position of chief engineer of the C. G. Spring and Bumper Co. He was formerly research engineer.

Sparks Retires From American Piston

The American Piston & Machine Co. announces the resignation of Chester J. Sparks as Secretary and Treasurer. He has been associated with this company since 1920, in charge of sales and manufacturing, and has developed the distribution of American pistons on a worldwide basis. His successor is Harry Madison, formerly connected with the American Screw Products Co. of Detroit.

OAKLAND ANNOUNCES NEW APPOINTMENTS

PONTIAC, MICH., Sept. 2—C. W. Matheson, vice-president and director of sales of the Oakland Motor Car Co., has announced the appointment of E. M. Lubeck as district manager at Chicago. Mr. Lubeck returns to Oakland from the Apperson Automobile Co., Kokomo, Ind., where he has been general sales manager for the last three years. The appointment of W. B. Sawyer as Boston district manager has also been announced. For the last five years Mr. Sawyer has been general manager of the Oakland Motor Car Co. of New England. C. G. Hall has been appointed assistant director of sales development of the company.

Main Goes to Detroit

J. Harry Main, former supervisor of purchases for the General Motors Corp., has been appointed Detroit district representative of the General Drop Forge Co. of Buffalo, with offices in Detroit.

Coppock Made Sales Manager

Albert Fisher, President of the Standard Motor Truck Co., announces that Orville Coppock has been made General Sales Manager of the company.

Witwer Is Zone Manager

J. Frank Witwer has become Kansas City zone manager for the Flint Motor Co. Jed Durkee remains as manager of the branch store. No other changes in the Kansas City branch are contemplated. Mr. Witwer began his career in the automobile industry seventeen years ago, selling the Studebaker Electric Truck. In 1911 he organized the Witwer Motor Co., merchandizing Garford and Marion passenger cars, Garford trucks and Ohio electrics. The next year, associated with W. S. Hathaway, he founded the Southwest Motor Co., selling Reo fours and sixes, Chevrolets and Detroiters. Later he became sole owner of that concern.

Developments of the Week in Leading Motor Stocks

NEW YORK, Sept. 3—Students of the stock market have been busily at work in the last few days trying to assign a reason for the reaction in stock prices, which have declined more consistently than has been the case in many months. Apparently the "technical position" of the market has been responsible for the setback. The weakness in the various groups has been largely in response to speculative operations for the fall, according to the best opinions in Wall Street. It was thought that speculation for the rise was considerably overdone. An unfavorable element, of which the professionals tried to make capital, was the calling of the anthracite strike.

Other factors also played a part in individual stocks, however. Taking a specific example, the erratic movement in the capital stock of Mack Trucks was due, in large measure, to the conjecture regarding whether or not there would be a meeting of the board of directors Tuesday for dividend consideration. It was announced, however, early this week that the meeting had been postponed until Sept. 9. Rumors have been circulated about the Street that the company would split its stock into smaller units and pay the equivalent of a larger dividend on the new units. These rumors have been denied from time to time.

Next to Mack Trucks, Chrysler was the most prominent in the last week among motor stocks. It is reported in the Street that the directors of this company will announce the retirement of preferred stock and report earnings of about $30 a share on common.

Despite the denials by Henry Ford regarding the close relationship between the Hudson Motor Car Co. and the Ford Company, Wall Street is not satisfied, and reports continue rife as to this relationship. It is understood that the two companies are closely related in a production way.

General Motors, now selling around 88, is receiving much speculative attention, and par is predicted as soon as the present market's technical position is corrected, and selling on the part of those who had expected more than $1 extra has been fully absorbed.

The temporary strength in White Motors in the last week was thought due to the buying on the rumor that Jesse Livermore, the well-known speculator, had purchased large blocks of White Motors and U. S. Steel. This rumor Mr. Livermore has just denied.

Moon Motor Co.'s record net earnings for July were announced as $187,274, which is at the annual rate of $12 a share on the 180,000 shares of no par common stock outstanding. The company has no funded debt, and its preferred stock was retired on March 31, 1923. The success of the company's Diana models, which were put into production in June, is largely responsible for the company's rapid increase in earnings, according to a recent statement made by President McDonald. In the first six months of the year $3.73 was earned on the common, as compared with $2.23 for the same period last year. August earnings are expected to be about the same as those for July; hence total earnings for the eight months will be about $5.75. The total year's earnings can be conservatively placed at $8.50. This compares with total earnings in 1924 of only $3.11. At the time of writing, the company's stock is selling at 31½, yielding more than 9.50 per cent. Since the stock is selling at a price less than four times the per share earnings, it is looked upon most favorably in Wall Street.

Wednesday's close found White Motors down 15 points from the year's high; Mack Trucks, down 40 points, and Chrysler, down 16 points, among the motor stocks.—J. L. H.

Trade Air Lanes Now Being Charted

Goodyear-Zeppelin Denies Attempts to Lease Ships from Government

AKRON, O., Sept. 2—Scientists connected with the Goodyear-Zeppelin Corporation are charting the Nation's air lanes to determine the safest transcontinental trade routes for Zeppelin airships, it is announced here.

Reports that the Goodyear Tire & Rubber Co., or its subsidiary, the Goodyear-Zeppelin Corporation, are trying to lease the Los Angeles or the Shenandoah from the United States Government, for experimental purposes over a new air trade line, are without foundation in fact, according to Goodyear officials.

"As manufacturers of the world's most successful lighter-than-air craft, we stand ready at all times to assist dirigible operating companies by suggesting to them the safest and best transcontinental and trans-oceanic air routes, the type of ships most suited to their purposes, and the best way in which to operate and maintain them," it was explained.

Work is progressing on several standardized rigid airship models. This is in charge of a corps of expert Zeppelin designers and builders, brought here several months ago from the German Zeppelin Co.

Specifications for the 5,000,000 cubic foot ship, twice as large as the Los Angeles, and plans for a super-Zeppelin, of 10,000,000 cubic foot gas capacity, are in the making. Akron airship designers say ships smaller than the 5,000,000 cubic foot size could not be operated profitably in trans-oceanic trade, and the bigger they are the more economical.

CALIFORNIA BUS LINES

SAN FRANCISCO, Sept. 2—Figures recently compiled by the California State Railroad Commission show that, out of a total of 1832 cities and towns in California, 786, or nearly 43 per cent, of those served by bus and motor truck lines have no other means of public transportation. There are more than 1000 bus routes operating in the State. One of these, only 150 miles long, sold late last year for $450,000, nearly all cash.

INDIANAPOLIS STUDIES AIRPORT

INDIANAPOLIS, IND., Sept. 2—An air mail survey is to be made through the newspapers in the near future by the Chamber of Commerce to determine what support may be depended upon for an airport here. John B. Reynolds, secretary of the Chamber, says that several air mail and express transport companies have made inquiries recently as to what the outlook is for the establishment of such services. The city is at present without a suitable landing field, although Fort Benjamin Harrison, the Government flying field, is only ten miles distant and is connected with the city by good roads. Representatives of Ford flying ventures were here recently, it is understood, to investigate the Army field and the possibility of using it for the civilian service.

Australia Purchases Fageol Equipment

OAKLAND, CALIF., Sept. 2—One of the first invasions by the American motor stage into Australia has been completed by the Fageol Motors Company, of Oakland, whose Sales Manager, J. H. Fort, has just returned from an eight months' business trip to the Southern Continent. While there, he sold the first all-American modern motor coach, complete with body, ever seen in Australia. He also sold a fleet of six parlor cars to the South Australian railways; a fleet of street car chassis coaches to the Brisbane Tramway Trust, in Queensland; several chassis to independent operators in Sydney, and other parts of New South Wales, and a fleet of double-deck buses to a large independent operator in Sydney. All these were Fageol-type cars.

First Long-Distance Bus Run

The first long-distance bus run with modern American equipment has gone into operation between Sydney and the new Federal Capital, 150 miles away, with Fageol six-cylinder cars, equipped with Westinghouse airbrakes. The debut of the Fageol bus in London recently created sufficient interest for the largest British motor journal to print several pages of photographs and description of the new vehicle.

Additions to Plant

The Fageol Company has just completed a two-story brick and steel administration building at its plant in Oakland, giving the executive and office forces, as well as the engineering department, more room and better facilities. The present administration wing of the main building is being converted into a production department, with offices for the factory superintendents. According to a recent report from the company, production of Fageol safety coaches, both four and six cylinders, and also Fageol compound motor trucks in five capacities is increasing every month, and, as compared with 1924, shows an increase of 100 per cent so far in 1925. The California plant has shipped this year 150 complete coaches to the other Fageol plant in Kent, Ohio, to assist in filling the orders received at the Eastern factory, where production of both chassis and bodies is being increased. Fageol motors originated in California, and its business has increased from $1,200,000 four years ago to more than $5,000,000 this year.

Interest in Air Meet Here Is International

Paris-New York Fliers and Long Distance Competitors to Participate

NEW YORK, Sept. 2—Preliminary arrangements for the New York 1925 Air Races, to be held at Mitchell Field, L. I., Oct. 8, 9 and 10, have been completed, according to word received by ex-Postmaster General Frank Hitchcock, of the Executive Committee. Three Army and Navy planes will be entered in the speed races, which, it is hoped, will bring the world's speed records back to this country. The government planes will be new Curtiss models and are expected to do 300 miles an hour, or more.

An international flavor will be added to the race by the presence of French, British, German and Italian entries. Frank S. Lahm, vice-president of the Federacion Aeronautique Internacionale, is at present on his way to Europe personally to receive and forward these entries.

Race to New York

Among the interesting features of the meet will be the "On to New York" race, prizes for which will be given to the men flying the greatest distance to attend. Colonel James P. Fletcher, of Cape Town, South Africa, has announced his intention of competing for this prize. Also of interest is the announcement that the French one-legged flyer, Paul Tarascon, and the one-eyed flyer, Francois Coli, will time their long-awaited Paris-to-New York flight to arrive here in the course of the meet, competing for the $25,000 prize offered by the National Aeronautic Association for the first person to make the flight. Breguet, the French aviator, is now on the way here with two planes to be flown in the meet; one, the ship used by Pelletier d'Oisy in his Paris-Shanghai flight, and the other, the one in which Le Maître Arrachard flew from Paris to Dakar.

General Peppino Garibaldi, grandson of the Italian Liberator, at present in this country, is to fly to Washington shortly to confer with the Italian Embassy on the possibility of obtaining a fleet of Italian planes to represent his government here at that time.

The meet will eclipse all previous ones in the history of aeronautics, both in the number of planes competing and in the international interest which will be aroused.

AVIATION COMMITTEE APPOINTED

SAN FRANCISCO, Sept. 2—Recognizing the importance of aviation to American cities, the San Francisco Chamber of Commerce, through its president, Clay Miller, announces the appointment of a committee on aerial affairs, with Capt. C. W. Sanborn of the Matson Navigation Co. as chairman.

Supreme Court Holds N. A. D. A. Law Valid

Constitutionality of National Motor Vehicle Theft Act Established

ST. LOUIS, Sept. 1—Constitutionality of the National Motor Vehicle Theft Act is completely established by the opinion of the United States Supreme Court in re Brooks vs. United States, according to C. A. Vane, general manager of the National Automobile Dealers Association.

He says that the decision handed down by Chief Justice Taft in this case, whose sole point was the constitutionality of the law, gives final sanction, after six years of effort, to the N. A. D. A. plan to thwart motor thieves, and removes all question as to the Federal right to punish those who steal motor vehicles in interstate commerce.

Ray Brooks, a Sioux Falls garage owner, was convicted of removing two stolen automobiles from Sioux City to Sioux Falls and sentenced to eighteen months in prison. The case went up to the Supreme Court, which called the quick passage of machines into another State to conceal the trail of thieves a gross misuse of interstate commerce.

The law was introduced in Congress by Representative L. C. Dyer of St. Louis at the request of the N. A. D. A. Mr. Vane describes the decision as of great importance to the automobile trade as a final endorsement of a valuable weapon in the hands of peace officers, who formerly hesitated to take action in the theft of cars from cities outside their States.

French Car Tax to Be Based on Value

PARIS, FRANCE, Aug. 22 (by mail)—A change in French automobile taxes, which are at present based upon horsepower and which were increased a month ago in proportions varying from 20 to 50 per cent, is forecast for the end of this year, according to a statement here by the Ministry of Finance. M. Caillaux, in a letter to the French technical departments, stated his belief that cheap cars should not be taxed the same amount as expensive machines of equivalent horsepower.

It is believed that the new basis of taxation, therefore, will be the value of the car. American cars will be favored by this new mode of taxation, for at present all the cheaper American cars are taxed considerably higher than European automobiles costing three or four times as much.

GERMAN ABSORBER FACTORY

PARIS, FRANCE, Aug. 22 (*by mail*)—The Repusseau Co. of Paris, holders of the Continental rights for the Hartford shock absorber, is manufacturing these at a factory recently constructed at Duesseldorf, Germany. The German factory will, it is said, be independent of the one in France and will supply the German market only.

Reo Cuts Prices on Cars and Speed Wagons

LANSING, MICH., Sept. 1—Prices on Reo passenger cars and speed wagons, one and a quarter tons' capacity, have been revised, the new prices ranging from $50 to $150 lower, effective today.

All models in the passenger line, as it is now manufactured, together with the speed wagon, having either the four or six-cylinder engine, are affected.

The new prices are:

Model	Price
Series G Sedan	$1,565
Series G Coupe	1,495
Reo Sport Roadster	1,665
Series G Deluxe Sedan	1,745
Speed Wagon (4-cyl., 1¼ tons)	1,035
Speed Wagon (6-cyl., 1¼ tons)	1,185

In the last five months, Reo, according to company officials, has broken all records for its twenty-one years of life in both production and sales. Recently, the Series G Sedan, Coupe and Sport Roadster have been the biggest sellers. The speed wagon has also enjoyed an unusual demand, so that the company now accounts for more than 125,000 speed wagons in active service.

Miller Rubber Co.'s Semi-Annual Report

The Miller Rubber Co. reports for the six months ended June 30, 1925, net income of $2,048,343, after interest, depreciation and Federal taxes, equal, after allowing for preferred dividends, to $32.81 a share ($100 par) on the 51,868 common shares. Net profits for the entire year 1924 totaled $2,216,878, or $29.52 a share on the common.

The income account for the six months ended June 30, 1925, follows:

Net operating profits, $2,968,010; depreciation, $554,067; interest and miscellaneous items, $72,000; Federal taxes, $293,000; net income, $2,048,343.

Will Build Trucks and Radiators in Old Plants

HAMILTON, ONT., Sept. 1—The Globe Manufacturing Co. has taken over two bankrupt concerns, the Beaver Truck Co., this city, and the Monarch Tractor Co., Brantford, Ont. The combined inventory of the plants approximates half a million dollars. Work in both plants will be continued, but on different lines. In the Beaver plant a new truck, known as the Globe truck model 43 will be assembled. All parts will be purchased and no manufacturing will be done. In the Brantford plant, where tractors have been made, automobile radiators will be manufactured. The company has Canadian rights for two types of radiators.

FINANCIAL NOTES

The Paige-Detroit Motor Car Co. has declared a quarterly dividend of 35 cents on the common, payable Oct. 1 to holders of record of Sept. 15, placing the stock on a $1.40 annual basis. In the preceding quarter, the distribution was 30 cents in cash and 10 per cent in stock. A regular quarterly dividend of 1¾ per cent has been declared on the preferred, payable Oct. 1 to holders of record of Sept. 15.

The Motor Wheel Corp. has declared a quarterly dividend of 50 cents a share on common, payable Sept. 20 to stock of record of Sept. 10. Previously, 40 cents a share quarterly was paid. The company will retire 1250 shares of preferred by allotment at $115, which will bring the balance of preferred outstanding to $1,250,000.

Goodyear Tire & Rubber Co.—E. G. Wilmer, Chairman of the Board, says nothing is pending regarding the paying off of the 30 per cent accumulated preferred dividend and no plans are under way for refunding the 8 per cent bonds and notes.

Norwalk Tire & Rubber Co.—The New York Stock Exchange has admitted to its list this company's $1,146,600 7 per cent cumulative preferred stock and $1,500,000 common par $10.

Moto-Meter Co., Inc.—The New York Stock Exchange has admitted to its list 200,000 shares of this company's no par Class A stock.

Yellow Truck & Coach Manufacturing Co.—The New York Stock Exchange has admitted to its list $6,000,000 of this company's Class B stock $10 par.

Electric Storage Battery to Build in California

SAN FRANCISCO, Sept. 2—The Electric Storage Battery Co., of Philadelphia, manufacturer of Exide and other storage batteries, has purchased a tract here which is to be used for a building to cost, exclusive of the site, approximately $200,000, according to announcement by George R. Murphy, in charge of the Pacific Coast division of the Exide interests since 1900. The plant is to be of two stories.

London Commercial Motor Show

LONDON, ENGLAND, Aug. 21 (*by mail*)—Sixty firms will exhibit at the Commercial Vehicle Show at Olympia next October, according to reports here. The makes will include thirty-eight British, seven American, eight French, four Italian, two Swiss and one Belgian. Fifty of these firms make gas-driven vehicles; six, steam wagons; three, electrics; and one, gas-electric.

Ford Company Leads in Tax Collections

Corporation and Heads Assessed Over $20,000,000—Other Payments High

DETROIT, Sept. 1—The Ford Motor Co., Henry Ford and Edsel B. Ford, paid almost one-fourth of the income tax collected by the first district of Michigan on 1924 earnings it became known today when the books of Fred L. Woodworth, internal revenue collector, were thrown open to the public.

The income for the district was $90,624,855.90. The Ford Motor Co. paid $16,493,160.91. Henry Ford paid $2,608,808.85 and Edsel B. Ford $2,158,055.99. Both paid higher taxes in 1923 with the company paying approximately $2,000,000 more on its 1924 earnings. The drop in the amounts each of the Fords paid is explained in the decreased rate on the income tax for 1924 over 1923.

General Motors Also High

Next comes the General Motors Corp. The exact figures are not known but are believed to be in the neighborhood of $5,000,000. The total will be announced in the annual statement to be issued by that company.

The Fisher brothers, Charles T., Fred J. and Lawrence, paid a total of more than $1,000,000. Mrs. Anna Thompson Dodge, widow of Horace E. Dodge, paid $993,028.48. Mrs. Mathilda R. Wilson, widow of John F. Dodge, paid $110,293.27.

Others well known in the automotive world and the amounts paid follow:

Dodge Brothers, Inc.	$2,450,843.67
Briggs Manufacturing Co.	1,590,060.77
Alvan Macauley	53,531.06
Walter Briggs	146,449.79
Howard E. Coffin	45,809.48
Roy Chapin	63,206.38
James R. Murray	9,332.08
Chas. T. Fisher	369,306.93
Fred J. Fisher	382,476.44
Lawrence Fisher	250,803.39
Fisher Body Corp.	2,240.000.00
Hudson Motor Car Co.	1,120,587.00
Packard Motor Car Co.	751,862.41

Highway Commission Guests of N. A. C. C.

NEW YORK, Sept. 2—Members of the American Commission to the Pan-American Highway Congress at Buenos Aires were guests at a farewell luncheon today given by the National Automobile Chamber of Commerce. Col. Charles Clifton, president of the chamber, presided and the speakers were H. H. Rice, General Motors Corp., chairman of the delegation; Roy D. Chapin, chairman of the board, Hudson Motor Car Co., and Percy Owen, chief of the Automotive Division, U. S. Department of Commerce.

Mr. Rice and Mr. Chapin brought out the thought that the purpose of the delegation was not primarily to increase the business of the United States in the southern countries, but to aid them for their own good in the solution of their social and economic problems, particularly as concerned transportation development.

"Latin-American countries are appropriating large sums for highway development," said Mr. Chapin. "They have money to spend, but none to waste, and the advice of these delegates, all experts in various phases of the problem, should be of the greatest possible help."

Commission delegates at the luncheon in addition to Mr. Rice were Charles M. Babcock, Minnesota Committee on Highways; Dean A. N. Johnson, School of Engineering, University of Maryland; Dr. G. A. Sherwell, secretary-general, Inter-American High Commission, and Pyke Johnson, Washington representative of the N. A. C. C. Among others present were R. E. Olds, Reo Motor Car Co., and W. E. Metzger, Federal Motor Truck Co.

Marquette Manufacturing Acquires Wood-Imes

ST. PAUL, Sept. 1—The Marquette Manufacturing Co. has purchased for cash the business, assets, patents, trademarks and good will of the Wood-Imes Manufacturing Co., manufacturer of a complete line of garage equipment.

None of the Wood-Imes organization will be connected with the Marquette company in any way. The Wood-Imes line will be made a part of the Marquette line, sold by Marquette salesmen. The purchase does not change or affect the officers and management of the Marquette company.

Both plants will continue to operate, the Marquette line to be made at the St. Paul plant and the garage equipment to be manufactured at the Minneapolis plant. The executive offices will be in St. Paul.

Stevens-Duryea Motors Increases Production

CHICOPEE FALLS, MASS., Sept. 2—Stevens-Duryea Motors, Inc., is gradually increasing its production of passenger cars, it was stated today by R. W. Stanley, treasurer. Body lines have been refined, but otherwise the car is essentially the same. Production of the Stevens-Duryea has not been suspended at any time by the present owners, Mr. Stanley said. There is no regular production schedule, cars being made as orders are received.

An improved outlook and more orders in hand for electric cars and taxicabs made by Rauch & Lang, Inc., is reported by Mr. Stanley, president of that concern, which shares its plant with Stevens Duryea. The gain is especially notable in the case of the electric passenger car, he said, orders for six cars having been received this week from two dealers.

July Employment and Payroll Show Gains

As Compared with Last Year, Marked Increase Is Seen in Automotive Trade

WASHINGTON, Sept. 3—Employment in 199 automotive establishments in July, 1925, totaled 293,341, which was 0.5 of 1 per cent less than the employment in June, 1925, which totaled 294,867. The last July payroll of $9,745,916 was 0.8 per cent less than the payroll for the preceding month, which was $9,820,441. These facts are brought out in the July survey of employment in selected industries made by the Bureau of Labor Statistics, Department of Labor, and just made public here.

Employment in all manufacturing industries in the United States decreased 1.1 per cent in July, as compared with June; the aggregate earnings of employees decreased 2.4 per cent, and per capita earnings decreased 1.3 per cent. The usual July closing for inventory taking and repairs, and the vacation season, were largely responsible for these decreases, which, however, were much less marked than in the corresponding period of 1924.

The July, 1925, payroll in the automotive industry, it is further brought out in the review, was 26.4 per cent larger in the number and 48.1 per cent greater in the amount than the July, 1924, payroll.

Shenandoah Was First of Its Kind Built Here

NEW YORK, Sept. 3—The lighter-than-air craft Shenandoah, which fell near Ava, Ohio, this morning about 4 o'clock, while on its way from its station at Lakehurst, N. J., to St. Louis, represents the first ship of its kind designed, manufactured and erected solely by Americans.

The Shenandoah was 683 ft. 4½ in. in length, with a maximum diameter of 78 ft. and gas capacity of 2,115,000 cu. ft. Its total lift was 129,178 lb. and its dead weight 80,000 lb. The metal framework was of duralumin, which was supposed to insure her against snapping in two in a storm. The gas bags, 20 in number, were made of a special cotton fabric, lined with gold-beater's skin, from the intestines of cattle, and were manufactured by the Goodyear Tire & Rubber Co. The five engines, with which she was equipped, were 6-cylinder, 300 hp., made by the Packard Motor Co. The fuel used was gasoline, which was carried in 48 tanks in the enclosed keel of the ship. Her maximum carrying capacity was 5,424 gallons. The supporting gas was helium. She had a cruising radius of 4500 sea miles, and her maximum speed was 70 miles per hour.

Production Proved Level to Demand

N. A. D. A. Gives Figures of Cars in Dealers' Hands July 1

ST. LOUIS, Sept. 3—The United States came nearer to an automobile shortage on July 1 than ever before in its history, says the National Automobile Dealers Association in analyzing the production and sales totals for the first six months of 1925. On that date there were approximately 10,000 new automobiles in the hands of 45,000 dealers throughout the nation, indicating that the greater number of dealers throughout the country were without new cars of any kind. At the same time there were approximately 200,000 used cars in the hands of the same dealers. In 1924 there were about 20,000 new cars in dalers' hands and approximately 300,000 used automobiles. In 1923 there were 60,000 new cars in dealers' hands and 400,000 used automobiles, and in 1922 about 175,000 new vehicles and 400,000 used cars in dealer hands.

Dealer Position Good

If all the automobile factories of the nation had together closed down a single day in the first six months, there would not have been a new automobile on sale anywhere in the United States July 1, as sales during the first six months of 1925 were averaging in excess of 10,000 cars and trucks daily.

That this period of buying has been one strongly advantageous to the manufacturers is shown by the tremendous increases in the net earnings of the leading producers, the gain in the stock market quotations of their shares and by the extra dividends declared by many and the swelled cash reserves with which they will go into the fall and winter months, says the association.

That it also has been advantageous to the dealer is declared by C. A. Vane, general manager of the National Automobile Dealers Association, in a review of the dealer position for the first six months of the year.

Net profits to automobile dealers this year while substantial because of the tremendous volume of business done, only average a return of about 3 per cent net on the gross amount of sales, the association executive declares. The association has declared as its policy, that the dealer is entitled to a minimum of 5 per cent net profit on the gross sale.

E. R. STETTINIUS DEAD

NEW YORK, Sept. 3—Edward R. Stettinius, a director of the General Motors Corp., died today at his home near Glen Cove, L. I. He was a member of the firm of J. P. Morgan and was chief purchasing agent for the Allies and later assistant secretary of war in the World War period.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Sept. 2.—The seasonal expansion in wholesale and retail trade continues, and industrial operations in several lines are responding to the upward movement. Further improvement in the outlook for grain and cotton crops was noted last week.

A new record for the year was reached by car loadings in the week ended August 15. These totaled 1,064,793, as against 1,051,611 in the preceding week, and 953,408 in the corresponding period last year. This is the fifth consecutive week in which loadings have exceeded a million cars.

Sales at retail were smaller in July than in June, but larger than a year ago. Mail order houses reported sales 29 per cent above those of July last year, while the gain for department stores was 4 per cent.

Production in basic industries increased about 2 per cent in July, after a continuous decline since January, according to the Federal Reserve Board. Wholesale prices advanced nearly 2 per cent, and the distribution of commodities continued in large volume.

Business failures reported to Bradstreet's for the week ended August 27 numbered 327, as against 311 in the preceding week and 339 in the corresponding period last year.

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended August 26 were 7.1 per cent below the total for the preceding week, but 10.2 per cent above that of a year ago.

Fisher's index of wholesale commodity prices stood at 157.3 last week, comparing with 158.7 in the preceding week, 160.6 two weeks earlier, and 161.4 three weeks earlier.

Earning assets of the Federal Reserve banks increased $35,400,000 during the week ended August 26, with gains of $20,200,000 in discounts, $6,200,000 in open market purchases and $9,000,000 in holdings of Government securities. Note circulation decreased $300,000; total deposits, $700,000; and total reserves, $17,900,000. The reserve ratio declined from 75.4 to 75.0 per cent.

Call loan rates were slightly higher last week, ranging as high as 4½ per cent. Time loan rates were unchanged at 4¼ to 4¾ per cent until Monday of this week, when the shorter maturities rose to 4½ per cent. Commercial paper continued at 4 to 4¼ per cent.

Business in Second Half-Year to Gain

In Absence of Unusual Conditions, Automotive Trade to Prosper

NEW YORK, Sept. 2—A cheerful view of prospects in the automotive industry for the remainder of 1925 was taken by David Beecroft, Business Manager of *Motor World Wholesale*, in a talk today before the Advertising Clubs of New York.

"It is highly probable that the unusually heavy sales of July and August will continue during the major portion of the second half of the year by virtue of the increased value and lower prices of the 1926 models," Mr. Beecroft said. "It can be definitely stated that unless some unusual conditions arise, the second half of 1925 will exceed by a very substantial margin the business done during the second half of 1924. The 4,000,000 production mark set in 1923 may be approached, and it is certain that last year's total will be exceeded."

Mr. Beecroft sees the year to date as distinguished in two ways. First, because several leading manufacturers have made a continuous and effective effort to regulate car production and retail sales for the purpose of not overstocking the distributors and dealers, as well as keeping inventories in a fluid state.

"The year has been quite unusual in another way," Mr. Beecroft continued. "The motor car manufacturers have so timed their announcements of 1926 models with price reductions as not to flatten out the sales during June, when old models were closed out. The effect was to stimulate business in July and August so that new records for retail sales and production were made for those months, July production this year being 68 per cent over the corresponding month a year ago."

COMMERCIAL AVIATION RECORD

NEW YORK, Sept. 2—A seaplane, designed by Grover Loening, and constructed at the plant of the Loening Aeronautical Corp. here last fall, has just completed a series of trips between this city and Saratoga which, it is claimed, sets a world's record for regularity of operation and safety in commercial aviation. The 400 h.p. so-called Loening Air Yacht operated daily for a month, without a single miss, from the base of the Curtiss Metropolitan Airplane Co., at Port Washington, L. I., to the racing city, flying a total distance of 9120 miles in the four weeks in 88½ hours. The average time for the trip was one hour and forty minutes, giving an average cruising speed of well over 100 miles an hour, although on several occasions storms were encountered. The motor used in the Air Yacht is a Liberty engine, built by the Ford Motor Co.

Trade Survey Shows Sound Condition in Most Sections

(*Continued from page* 388)

on old tires that probably would have been discarded had the prices of new ones not been advanced.

A tendency to lower still further the terms of financing new car sales appears in some sections of the Middle West and on the Pacific Coast.

From widely separated sources come rumors and announcements of small, light cars on the European model, to be made by American firms and sold both here and abroad. It appears that plans along these lines that have been nourished in secret for some time are all being brought to fruition almost coincidentally. The purpose is not only to offer direct competition to the European makers of these economical and popular vehicles, but also to find a market for them here on the basis of their economy and convenience in congested traffic centers.

Detailed trade reports from various sections are as follows:

New England

Motor car sales slackened somewhat in August. The decline was not as great as in the corresponding month of former years, but it was enough, generally speaking, to cause dealers to work harder to put over sales. In a few cases the retailers are behind in orders, but these are infrequent. Outside the urban centers, dealers are not doing as well as some had expected. Finance men find that many car buyers seem to be so busy with the lure of the outdoors that they have overlooked their payments. Figures of used car sales in the Boston district seem to indicate that stocks are increasing, though apparently not to an alarming extent. Truck and accessories and equipment sales are excellent.

Central Atlantic

Varying conditions are reported in this section. Western New York finds that there was a slight improvement during the last month, while Pennsylvania showed a recession in most sections. The prospect of a strike had an adverse effect on the sales in the anthracite region, but in Philadelphia the prospects were regarded as excellent, as the city is undergoing big improvements calling for large numbers of workmen on engineering projects, including work on Sesqui-Centennial buildings and site. In the farming districts, the situation is also favorable, particularly where tobacco and truck crops are being grown. Around Harrisburg, sales, in many instances, were limited by the number of new models which dealers could obtain from the factories. In Pittsburgh, prospects show a tendency to improve, but realization of the betterment may be delayed somewhat. The steel industry is in a better condition and this will undoubtedly have its effect on automotive sales.

South Atlantic

Satisfactory business, on the whole, is reported from this section. Baltimore reports trade slightly better than normal and good fall business is predicted by dealers and distributors. Stocks are in excellent condition, and the used car problem was never less pressing. Norfolk, on the other hand, reports that premature information on changing models and prices has retarded sales, but as this condition has now been removed, the outlook is regarded as very favorable. Used cars are moving rather sluggishly. No more than the seasonal dullness is reported from Charlotte, and this is attributed particularly to the exhaustion of the farmers' supply of ready money. Within a month, however, the harvesting of cotton will be well under way and tobacco growers will have disposed of important quantities of their leaf. The future largely depends on the prospective yields of crops, principally cotton. Tobacco crops of North and South Carolina are running close, on the average, to those of last year. The crisis for the cotton crop is at hand, and much of the corn crop has reached maturity, with yields far below the average. In accessories, equipment and tire lines, a normal season is being experienced.

In Georgia, the used car business has been unusually active, and new car and truck sales are also on a prosperous level.

Eastern Central

Improvement over July is reported from most sections of this territory. Indianapolis finds that the outlook is for good sales during the next two months, with rural sections running ahead of the most optimistic forecasts. Around Columbus, new car sales have showed a decided improvement, but the used car market is slow. Only through price reductions were dealers able to dispose of the surplus that had accumulated.

In Chicago, sales are described as on a par with June, which is one of the best months in the year. Used cars are also selling very well.

In Milwaukee territory, sales are running well ahead of the corresponding period of last year.

In the important industrial region around Canton, Ohio, there has been some recession in sales, but there are optimistic predictions for fall business. The accessory and equipment plants are operating on higher schedules than a month ago, an important index of the confidence felt by car-makers in the outlook for future business. Cincinnati has shown some improvement, but the real benefit of the August announcements of new models and price reductions is not looked for until later this month.

Toledo reports that the new car market showed a slackening tendency during the last few days of August, but confidence is felt in the prospects for September and the later months. The Willys-Overland Co. has announced a schedule for the current month of 25,000 cars. Throughout this section, the parts and accessories business is good on the whole, although Akron finds that sales of replacement parts are rather dull.

Gulf

Some hesitation in buying new models is reported in Florida, and car owners in many instances are having their machines renovated rather than buying the latest offerings. As a result, August was a good month for the selling of almost all automotive equipment lines. The used car market is satisfactory.

Texas reports about 10 per cent gain in new car sales for August over July, with rural demand for lower priced cars particularly in evidence. There was some gain also in used cars, but prices have been cut heavily for the purpose of moving stocks. In trucks, tractors, accessories and parts, gains were also registered in August.

Mountain

Fairly healthy conditions are reported from this region. In the North, buyers held off for a time when most of the price reductions were being announced as they desired to see how far the declines would go. These bargain hunters are now coming back into the market. Used cars are not moving as freely as could be desired, despite the stimulus of special sales.

In Colorado, the automotive market is spotty, with the mining districts quiet as a result of strike threats. The Northern districts, where the sugar beet is grown, are affected by poor crop conditions. In the Western section, on the other hand, a fine harvest is looked for, and sales are correspondingly in better shape.

Western

Generally speaking, the States in this territory are experiencing a better-than-

normal business for this season. In Southern California, the new models are selling well, yet dealers in lines which do not feature yearly changes declare that their sales have not suffered. The weak spot seems to be in certain quarters of the low-priced field. Used car turnover is on a satisfactory basis. Competition in this territory was never keener and apparently the twenty-four-month time payment plan has definitely arrived. It was introduced by one large distributor and others have followed suit. There are now comparatively few dealers in Los Angeles who will not accept the two-year payment plan if the prospect insists on it, although many of them do not openly feature an appeal longer than eighteen months.

In Northern California, sales of both trucks and passenger cars in August showed a substantial increase over the same month last year.

In the Oregon territory, improved crop prospects have definitely stimulated sales of all lines of automotive merchandise.

Western Central

Throughout this region, car sales in the month just past have exceeded the most sanguine expectations. Shortages are reported from several important centers, and used car trade is lively. Parts and accessory lines are having a good season, but tire sales have been disturbed by the frequent price advances. Crop conditions are the dominating factors in Missouri, Minnesota, Iowa and the Dakotas. The corn crop is not as good as had been hoped, but other crops are all in satisfactory condition.

Particularly easy money conditions are reported, and around Kansas City it is said that finance companies, in some instances, are granting twenty-two months for the settlement of unpaid balances on new cars. Generally speaking, however, eighteen-month terms are the rule, some still holding to the twelve-month basis, with one-third down in practically every case.

Southern

Sales in August were less than in July, but well ahead of the corresponding period last year. Some disappointment was felt because price reductions failed to prove the sales stimulant expected, but dealers look for better business later, now that the wave of cutting is over and the situation is thereby stabilized on a new level.

Dealers, particularly in the Louisville territory, are refusing to increase sales through exhorbitant allowances for used cars but, while this restricts new car sales to some extent, favorable results are apparent in the smaller used car stocks on hand.

Throughout Tennessee and Alabama the situation is much the same, although around Birmingham there has been some difficulty in moving used cars. This same city, however, finds that accessories and tire dealers are doing particularly good business and that credits are in fine condition, the number of repossessions on new cars having been surprisingly low in the late summer.

Ford Chain Block Co. Obtains New Patents

PHILADELPHIA, PA., Sept. 2 — The Ford Chain Block Co. has acquired the exclusive right to the patents of the Motorbloc Corporation, and will manufacture and sell Motorblocs, which are electrically-operated portable hoists, consisting primarily of the assembly of a standard chain hoist and an electric motor, as a Ford product. Until Oct. 1 operations will be continued at the Summerdale plant, as well as at the large plant of the Ford Chain Block Co., after which date all Motorblocs will be manufactured at the latter factory.

William C. Briggs, Secretary and General Manager of the Motorbloc Corporation, will be associated, in the manufacture and sale of the product, with the Ford Chain Block Co. Mr. Briggs, for twelve years, was with the Shepard Electric Crane Hoist Co.. and, for five years, was the company's New York manager.

CHRYSLER MOVES PARTS PLANT

DETROIT, MICH.. Sept. 2—The parts plant of the Chrysler Corp. is being transferred from Newcastle, Ind., to Dayton, Ohio. according to an announcement by J. E. Fields, vice-president in charge of sales. confirming information given previously by AUTOMOTIVE INDUSTRIES. In the future all replacement parts for the Chrysler four and six, the Maxwell and Chalmers will be marketed from the Dayton plant, all the service parts equipment having been already transferred.

The change was made possible through placing the closed body work with the Fisher Body Corp., thus releasing the buildings at Dayton in which this work was formerly done. The buildings at Newcastle have been turned over to the production department.

Eight Air Mail Routes Are Opened to Bidding

WASHINGTON. Sept. 1 — Eight air mail routes, extending over nearly every part of the United States, are being advertised for private contract, Second Assistant Postmaster General Glover announced recently. The bids will be opened Sept. 15. Private contracts will be closed immediately thereafter, and will go into effect as soon as the companies can get their equipment in the field.

The New York-Chicago Trans-Continental route, with which the other eight connect, will continue under the operation of the Post Office Department at least until July, 1926, unless Congress otherwise disposes of it before then.

Car Finance Terms Easier in the West

Plan Is Generally Adopted by Dealers, Owing to Strong Competition

NEW YORK, Sept. 2—The tendency to easier financing terms is still pronounced in some sections of the country, especially the Middle West and on the Pacific Coast. Late reports show that two-year terms are now almost universal in and around Los Angeles, and that in Kansas City a twenty-two month plan is making rapid headway.

"There is little doubt but that the two-year payment plan is here to stay," says Robert S. Breyer, president of the Los Angeles Motor Car Dealers Association. "Competition has forced its almost general adoption by dealers here and once it is offered to the public it is mighty difficult to recall it. It is like giving an employee a raise one week and then going to him the next and saying that you must retract your generosity.

"There is no doubt that this situation will lead to greatly increased repossessions and may cause serious consequences in some quarters. Dealers who want to preserve their business efficiency and their net profit return are meeting the new payment plan, but are watching their deals closely."

From Boston comes the report that difficulties in collecting instalments on unpaid balances are increasing.

Italo-Russian Company Seeks Persian Markets

LONDON, ENGLAND, Aug. 24 (*by mail*)—An Italo-Russian company has been formed, in which Italian automobile and tire firms are financially interested, to open up trade with Northern Persia. The route to be followed is by sea to Batum, thence across Caucasia by rail to Baku. From this port steamers will proceed down the Caspian to Enzeli, and thence consignments will proceed by road to Teheran.

An alternative route likely to be exploited will branch off at Tiflis, reaching Tabriz by way of Djulfa. The first cargo, including a variety of automotive products, is now en route. The rich and growing market of Northern Persia seems likely to become an Italian monopoly, for by this route half the time in transit will be saved, as compared with Persian Gulf route.

IMPROVED MECHANICAL COURSE

DETROIT, MICH., Sept. 2—The Michigan State Automobile School is now combining a business course with its course in mechanics. J. E. Mills, service manager of the Detroit Branch of the Packard Motor Car Co., is in charge of the new work.

Coming Events

SHOWS

Sept. 8-11—New Haven, Mason Laboratory, Yale University Machine Tool Exhibition, direction of Amer. Society of Mech. Eng., Chamber of Commerce and Yale Mechanical Engineering Department.

Sept. 14-19 — Cleveland, Public Auditorium, Annual Convention and Exposition, American Society for Steel Treating, W. H. Eisenman, secretary.

Sept. 21-26—London, England, Annual Cycle and Motorcycle Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.

Sept. 28-Oct. 3—Chicago, Fourteenth annual Safety Congress and Exhibit, Rainbow Room, Hotel Winton, under direction of National Safety Council, A. M. Smith, business manager.

Oct. 5-9—Atlantic City, Young's Million Dollar Pier, Manufacturers' Exhibition in connection with American Electric Railway Association Convention.

Oct. 8-17—London, Olympia passenger car show.

Oct. 18-31 — Salonica, Greece, First International Sample Fair.

Oct. 29-Nov. 7—London, annual truck show.

Nov. 26 - Dec. 6 — Berlin, Germany, Annual Automobile Show in the Kaiserdamm.

CONVENTIONS

Sept. 14-19 — Cleveland, Public Auditorium, Annual Convention and Exposition, American Society for Steel Treating.

Sept. 14-17 — Automotive Electric Association, Forest Inn, Eaglesmere Park, Pa.

Oct. 5-9—Atlantic City, Young's Million Dollar Pier, American Electric Railway Association.

Oct. 7-10—Montreal, Motor and Accessory Manufacturers Association Convention.

Oct. 21-23—Boston, Fall Meeting, American Welding Society.

RACES

Sept. 7—Altoona, Pa.

Sept. 19—Syracuse, N. Y.
Sept. 20—Fresno, Cal.
Oct. 10—Baltimore-Washington Speedway, Laurel, Md.
Oct. 12—Salem, N. H.
Oct. 24—Charlotte, N. C.
Nov. 26—Los Angeles.

S.A.E. MEETINGS

National

Aug. 27—Hotel Commodore, New York, Motorboat Meeting.
Sept. 15-16—Cleveland, Production meeting and exhibition.
Nov. 12-13—Philadelphia, Automotive Transportation meeting.
Nov. — Service Engineering meeting.

Moon 1926 Models Show Improvements

ST. LOUIS, Aug. 31—Numerous refinements have been incorporated in the Moon Series A models for 1926. The radiator shell is deeper and the fenders are more deeply crowned and an inch wider. The raised center panel on the fenders has been eliminated and a molding substituted. The front fenders are longer and this change has reduced the length of the runningboards. All chassis sheet metal work has been redesigned and a cover has been added at the rear which conceals the gasoline tank and the spring horns.

On the roadster model, all moldings have been eliminated, the body panels now being offset at approximately the same location formerly occupied by the molding. This offset eventually works itself over the cowl and forms an arrow head with its apex at the back of the radiator shell. The arrow spreads out into a three-quarter inch molding running down the front edge of the hood. The upper portion of the body formed by the offset panel is given the darker color of the two-tone combination, a contrasting strip being provided where the two colors meet. The front and rear compartments of this model have both been enlarged.

Tung-Sol Introduces New Bi-Focal Bulb

NEWARK, N. J., Sept. 2—A headlamp bulb incorporating two 21 cp. filaments has been brought out by the Tung-Sol Lamp Works, Newark, N. J., under the name of Bi-Focal. The base of this bulb has double contacts and the driver can change from one filament to the other simply by switching.

Mounted in the lamp, one filament is slightly above the other. The lower filament provides the long range driving beam while the upper one furnishes a depressed beam of full intensity. Thus, glare is avoided and, at the same time, the driver has ample road illumination for driving, which is not the case under all conditions when dimmers are used.

A feature of this bulb is the corrugations in the end of the glass. These are provided to redirect any stray rays which would otherwise project above the horizontal and cause glare. The new bulb is used as factory equipment on the Buick.

G. M. and Yellow Cab Merger Ratified

NEW YORK, Sept. 2—Final ratification of the merger of the Yellow Cab Manufacturing Co. and the truck division of General Motors Corp. took place when Yellow Cab directors authorized issuance of 800,000 shares of common stock in exchange for 160,000 shares of General Motors Truck Corp. stock. Operation of the two concerns under the name of the Yellow Truck & Coach Manufacturing Co. became effective yesterday.

For the first half year, Yellow Cab Manufacturing Co. reported net profit of $1,206,716, equivalent, after preferred dividends, to $1.97 a share earned on 600,000 shares, $10 par, Class B stock, compared with $2.96 in the first half of 1924.

June quarter net profits were $589,657, equal, after preferred dividends, to 97 cents a share earned on Class B, against $1.32 the same quarter last year.

For the four months ended April 30, General Motors Truck Division reported net loss $415,100, after charges. Total net sales were $4,458,798; net operating profit, $159,057; miscellaneous income, $14,851; total income, $173,908; depreciation, $112,778; total deductions, $476,230.

DE MATTIA IMPROVES PLANT

GARFIELD, N. J., Sept. 2—De Mattia Bros., Inc., suppliers of equipment for the manufacture of automobile tires, are adding an extension to their foundry in Clifton, which will almost double the capacity of the plant and will provide additional space for their chuck machine shop, located nearby. A through craneway over their yard and modern storage bins are to improve the side-track facilities of the plant.

Plans for N.S.P.A. Meeting Completed

DETROIT, MICH., Sept. 2—Detailed arrangements for the convention and exhibition to be conducted by the National Standard Parts Association at the Hotel Sherman next November were completed at a recent meeting of the Show Committee at N. S. P. A. headquarters here.

The convention will be held on Nov. 5, 6 and 7 in the Louis XIV room of the Sherman and registration will open Wednesday, Nov. 4, at 5 p. m. There will be an open session Thursday afternoon; the first business session Friday morning; a divisional meeting Friday afternoon, and a second business session Saturday morning.

Guests Admitted

Speakers of national reputation will talk to the delegates who attend the banquet, which will be held in the same room on Saturday, Nov. 7 at 7 p. m. Attendance at the first session will be open to delegates, alternates and guests. The remaining sessions will be open to delegates and alternates only.

The exhibition of products will be held in the new exhibition hall of the Hotel Sherman on Nov. 5, 6, 7 and 8. Manufacturer members of the Association, non-member manufacturers, by special invitation, and trade publications will be eligible to exhibit. The exhibition will be open from 9 a. m. to 10 p. m. Thursday and Friday; from 9 to 6 p. m. Saturday, and from 12 noon until 5 p. m. Sunday. Floor diagrams, contracts and application blanks were mailed out Aug. 24 and 25. Floor space is more than 8000 square feet and the facilities are splendid for an exposition of this type.

NEW PLANT ADDITIONS

RACINE, WIS., Sept. 2—The Twin Disc Clutch Co. has started work on the first unit of a comprehensive new plant program.

The Modine Manufacturing Co., producers of radiators, is also building an addition to its plant.

AUTOMOTIVE INDUSTRIES
VOLUME 53 *New York, Thursday, September* 10, 1925 NUMBER 11

Automotive Factory Labor Costs Cut 10 to 50% in Last Two Years

Reductions have been brought about, however, by more efficient production methods and earnings of individual workers have not suffered. Fewer men are now required per unit of output.

By Norman G. Shidle

FEWER men per unit of production are being used in automotive manufacturing today than ever before. Reductions in the number of workers needed to build a given number of vehicles or parts range from 10 or 15 per cent to as much as 50 or 60 per cent within the last two years.

Since labor costs are only one factor in total production cost, this single item cannot be held entirely responsible for the price cuts which have been made in the last twenty-four months, but the increased efficiency of the individual laborer certainly can be counted as a definite influence in the situation.

This influence seems to have been particularly marked within the last two years according to reports received recently from a number of factories.

Production men give a variety of reasons for the reduction in number of employees per unit of production, but such reduction has taken place in practically every automotive plant. Among the chief factors contributing to it are:

1. Improvement in factory methods and installation of more labor-saving machinery.
2. Working out of group methods of incentive wage payment which have made it profitable for the individual worker to have as few men in his group as possible.
3. Changes in vehicle construction designed to simplify production and manufacturing problems.

While the number of men per unit of production has been going down, the actual earnings of individual workmen in automotive plants has increased slightly on the average. In many cases, individual earnings are just about the same as they were a year or two years ago, while slight increases have been recorded in several instances. Large increases are reported only in a few factories.

Since individual earnings have increased only slightly and since the number of men per unit of production has been decreased materially, it is evident that automotive labor costs have decreased materially in the last year or two.

While recognizing the importance of this saving, too much weight should not be laid upon it when the question of car prices is being considered. That it has helped to make possible lower prices is certain; that reduction in labor costs alone has not been the prime factor in such reductions is almost equally certain. In considering the relation between selling price and labor costs, it should be remembered that in some factories the labor cost is only 10 or 15 per cent of the total manufacturing cost; which means that it is even a smaller percentage of the retail selling price.

Investigation of wage trends in the automotive industry, however, indicates that manufacturers in general have taken the sound psychological path in their attempts to reduce labor costs. They have sought decreases—

> "INVESTIGATION of wage trends in the automotive industry indicates that manufacturers in general have taken the sound psychological path in their attempts to reduce labor costs.
>
> "They have sought decreases, not through attempts to decrease the earnings of individual workers, but through improving methods of handling material and performing operations so that one man can do more work without decreasing his accuracy or precision.
>
> "Thus the costs to the management are reduced while the individual workers who remain within the given plant are better off than under less efficient conditions of production."

not through attempts to decrease the earnings of individual workers—but through improving methods of handling material and performing operations so that one man can do more work without decreasing his accuracy or precision. Thus the costs to the management are reduced while the individual workers who remain within the given plant are better off than under less efficient conditions of production.

This tendency of the automotive industry to provide and maintain a high degree of individual incentive for its workers and to operate insofar as possible in accord with sound principles of industrial relationships throughout its activities doubtless is largely responsible for the relative freedom from labor troubles experienced by automotive factories.

High wages and constantly increasing incentives have been relatively easy to provide, of course, during the period of rapid growth of the industry. More careful handling of the details of industrial relationships probably will be necessary in the next quarter of a century than in the last if labor relations are to continue as smoothly as in the past. There are evidences, however, that such needed attention will be given.

Sloan's Statement

One example of the consideration of the individual worker in general planning appears in the statement just issued by Alfred P. Sloan, Jr., president, General Motors Corp., in which he discusses the need for dealers to stock cars at certain periods of the year, despite the fact that production is being held closely in line with sales, basically. To vary output exactly to conform to seasonal consumer demand, Mr. Sloan points out, is impractical from a manufacturing standpoint, one reason for this being the labor situation.

"It would be practically impossible," he says, "even if the factory capacity were available, to handle the labor situation. Labor would not always be available when needed.

"Moreover, workmen are entitled to steady employment, or as near steady employment as can be provided.

"Any factory operating on a varied program would be absolutely unable to keep its skilled employees, and even if it were possible to obtain sufficient new employees at the times of peak production, the quality of the product would suffer because inexperienced labor, unfamiliar with the particular product, would have to be used."

Mr. Sloan's statement is important because it is typical of what many other automotive executives have been saying for some time and because it states clearly the policy which has motivated a number of prominent producers in their employee relationships for a number of years.

Specific figures to show the relative efficiency of automotive labor today as compared with one or two years ago could be obtained only after an extremely exhaustive investigation. Communications received from over twenty representative vehicle and parts makers, however, show the undoubted accuracy of the general conclusions drawn in previous paragraphs. Factory records of one important maker who produced in excess of 50,000 vehicles last year, for example, show the following trend in the relationship between number of employees and number of units built for three typical monthly periods:

Month and year	*Men employed*	*Cars built*	*Men per unit*
May, 1925	4428	4721	0.938
March, 1924	3703	3642	1.017
June, 1923	3898	3819	1.021

An important axle manufacturer uses 40 per cent less men per unit of production today than he did in 1923, while a relatively new car producer with a good-sized production employs only 10.7 men per unit of production now as against 17.9 men per unit of production a year ago.

Radical changes in models and products, of course, make comparisons difficult in a number of factories, but enough specific data are available to prove definitely that the automotive industry as a whole is continuing to make very definite progress in reduction of labor costs.

Common Labor Decreases

The amount of common labor required in automotive production seems to be decreasing constantly, more efficient methods of handling materials being the major factor in promoting this trend. The rates for common labor have changed very slightly in the last two years, taking the industry as a whole. With various individual exceptions, it may be said that common labor in the automotive industry is drawing between 40 and 50 cents an hour at the present time, the rate varying with the particular locality. Two years ago the level was slightly lower, common labor rates ranging more generally from 40 to 45 cents an hour.

The trend toward greater labor efficiency in the industry seems to have resulted in an attitude—largely justified perhaps—of extreme apathy toward the question of training skilled workers. While there is a general recognition of the fact that skilled workers of various kinds always will be needed in automotive work, production men in general seem to be content to hire those men who have been trained by other industries and devote their own time to other phases of the manufacturing problem.

The way to relieve the shortage of skilled labor, in the opinion of a good many automotive engineers, is to devote even more time and attention to the development of labor saving equipment. Speaking of the methods used to combat the labor shortage which followed the war, E. F. Roberts, vice-president of engineering, Packard Motor Car Co., writes that "possibly the greatest accomplishment was made toward solving the problem in the enormous amount of effort and money expended in employing and operating mechanical equipment." Describing the efforts of the Packard organization along this line, Mr. Roberts continues:

How Packard Cut Costs

"Cranes and chain falls were installed to eliminate heavy lifting, specially designed trucks were obtained to facilitate transportation and to eliminate the possibility of damage to finish and the attendant duplication of labor. A progressive system of manufacture was installed, along which the various units of production were assembled in progressive system. These and other economies too numerous to mention have taken place in the manufacture of automobiles until today better automobiles are being built in larger quantities and at a lower cost than at any previous time.

"This work still is going on, perhaps at a more rapid pace now than at any other time. It is these things in the opinion of the writer that has done much to relieve the shortage of skilled labor in the automotive industry."

Mr. Roberts points out, however, the particular care which is taken in instructing new employees when they first come into the plant, and indicates a full appreciation of the need for properly instructing individual workers in relation to their tasks.

Despite mechanical advances, however, there is a

strong feeling on the part of some executives that actual training of workmen is a future need of the industry. E. K. Wennerlund, General Motors Corp., writes, for example, that "It is true that the old apprentice system has broken down. Under existing factory conditions it is doubtful whether it could be reinstated. Only through favorable combinations of circumstances or exceptional personal ability do automobile factory employees get the broad experience required for foremanship.

"But something will have to be done sooner or later, or the lack of trained executives will be felt severely. . . . Vocational training schools probably offer the best solution of the problem under present industrial conditions."

This view is reinforced by that of another practical production man who thinks that "there is unquestionably a vital need for the systematic training of skilled craftsmen and manufacturing executives in the motor car industry and it is my impression that less is being done in this direction in the automotive industry than in other industries which have been longer established."

The view of a machine tool executive on this subject is interesting. E. P. Blanchard of Bullard Machine Tool Co., after discussing the human as related to the mechanical and social phases of the problem, writes that "the small shops form the training schools for mechanics whose ability, both mechanical and executive, carries them to the larger industries and the control of mass production. Even the most philanthropic suggestion regarding the labor problem has been tried with more or less success and with it all there still persists the vision of the machine builder who designs and installs equipment, ever progressing and improving, which shall eventually provide the solution of the economic phase of our problem."

In any case there is little disposition on the part of automobile manufacturers to enter actively into any campaign of training skilled workers. An opinion received from one of the largest producers in the automobile field sums up the current ideas along this line rather well. He writes:

"A year or so ago we spent some time studying apprentice systems with the idea that we might find it advisable to start a school in our own plant. We finally decided, however, that we could not produce any better results than those obtained in the technical high school operated by the local board of education.

"As only a few of our employees are men skilled in trades, we probably do not feel the necessity for training schools as keenly as manufacturers in some other lines and have not found that there is any scarcity of properly trained men to supply the variety of needs of our plant."

Railroad Crossings and Warning Signals

AT the international Railway Congress held in London some time ago one subject dealt with which interests the automobile industry was that of level crossings. To railway men, level crossings are a heavy source of expense, because all those at which there is much traffic require watchmen, and the need for thus guarding these crossings is increasing every day with the amount of travel (chiefly automobile) on the public roads. According to one report made to the Congress, the French railroads have been endeavoring to do away with the costly guarding of the crossings and have petitioned the Department of Public Works for permission to do so, but objections were raised by road users and the matter has rested in the Department since 1922.

A report on the subject covering conditions in the United States was presented by G. J. Ray of the D., L. & W. Railroad. Mr. Ray said the laws and regulations pertaining to level crossings varied greatly in the different States, but the safety of the public was the first consideration. Improved mechanical devices for warning the public of approaching trains had made it possible for railroads to discontinue flagmen at a number of crossings. The authorities were permitting the use of these on highways where the density of traffic did not present a difficulty.

Where crossing gates were installed they were always operated by the attendant by means of mechanical, electrical, or compressed-air devices. As a rule, one crossing only was worked by each gateman; sometimes, however, two or more nearby crossing gates were operated from a central elevated gatehouse.

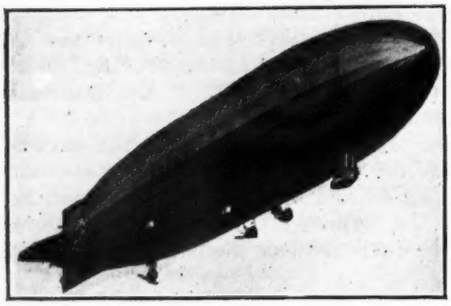
There were 256,000 public level crossings on first class railroads in the United States; many of these, which formerly were unimportant and only slightly dangerous, had become a menace to life on the highway and an obstruction to the safe passage of trains. The general abolition of crossings, although desirable, could only be considered in thickly populated districts and where rail traffic was dense. An average of 30 per cent to 35 per cent of the cost of eliminating level crossings was borne by the public in the United States. In Canada the expense was apportioned as follows: railroads, 35 per cent to 50 per cent; municipalities, 35 per cent to 40 per cent; Government level crossing fund, 15 per cent to 25 per cent.

The warning apparatus should be hidden from public view during the time they are under supervision. Among the best types of automatic apparatus, those having two scintillating lights or oscillating signals, that could be depended upon, were regarded as valuable. Whatever was used should show a danger signal to road users, should the equipment get out of order. Standardization of the devices used for signaling at crossings was desirable, so that their indications would be understood by all using the roads of any country.

New Type of Road Pavement

REPORTS concerning a new form of road pavement, known as a silicated pavement, have been received from France. In the vicinity of Besançon some twelve miles of this road have been under observation of the Department of Ponts et Chausees. Soft calcareous materials are used and furnish a resilient road with an extraordinary hard surface. The materials are mixed with silicate of soda. At the road surface the silicate of soda, which has thoroughly permeated the road materials, is acted upon by the carbonic acid of the air and forms a hard layer of silicate of lime. As this upper layer wears away, fresh silicate of soda is exposed, and the process of hardening continues automatically with the wear. The silicated road is said to cost about twice as much as the ordinary macadam construction, but to wear four times as long.

Salient Facts About Ill-Fated Shenandoah



This close-up of the Shenandoah was taken with the giant ship in flight and shows the location of the control cabin which was torn from the hull during the fatal storm and fell to the ground, resulting in the death of all inside, including Commander Lansdowne

SHENANDOAH — "Daughter of the Stars." Ex-ZR-1.

Built, Lakehurst, N. J.; first American rigid dirigible.

Commander, Ralph D. Weyerbacker, construction chief.

Took 18 months to build; cost $2,000,000.

Length over all, 680 feet; diameter 78.7 feet.

Height, 93.18 feet.

Crew of 30 men. Commander, F. F. McCrary, first captain.

Relieved by Commander Zachary Lansdowne, February 10, 1924.

Volume helium gas 2,115,000 cubic feet. Twenty cells.

Gross lift, 60 tons. Deadweight, 75,000 pounds.

Power, six 300 H.P. Packard engines.

Maximum speed, 60 knots; cruising speed, 45 knots.

Range, 1910 miles at maximum; 2,300 miles at standard speed.

Test flight, September 4, 1923.

First flight over New York City, September 11, 1923.

First long flight, October, 1923, to St. Louis.

Broke loose and rode out gale January 16, 1924.

October 25, 1924, completed 8,100 miles swing around American continent. Away 18 days.

Lost September 3, 1925.

Shenandoah Disaster Holds Technical Lessons for Aircraft Builders

Reduction in ratio of total length to extreme diameter likely in future designs, says Ralph Upson. Dirigible work to go on.

By Leslie S. Gillette

WHILE the tragic accident of the "Shenandoah" marks the fourth major disaster that has overtaken the United States in its lighter-than-air craft developments, the belief is maintained in some aviation circles that the latest blow suffered by the U. S. Navy department will, rather than having a crushing effect on future airship development, give further impetus toward effecting ultimately more airworthy and reliable dirigibles in order that we may maintain our supremacy in all aerial achievements.

When it is officially known that lighter-than-air craft experimentation will continue to proceed as heretofore, everyone will feel justly that Commander Z. Landsdowne and the thirteen members of his crew who perished with him when the ill-fated "Shenandoah" crashed during a violent storm at Caldwell, Ohio, on Sept. 3, will not have given their lives in vain. These men in their endeavors to conquer the problems of air transportation by dirigibles have gallantly paid the supreme price in carrying out their line of duty.

"This regrettable accident must not in any way daunt our efforts toward perfecting the rigid type of airship. *It would be folly, however, to lay down plans for any more ships like the Shenandoah until we are satisfied that proper improvements have been made. We must profit by the lessons of the disaster and through our engineering resources prevent any possible recurrence of structural failure of the airship itself through abnormal stresses set up within the ship by any natural phenomena.*" This statement, made by Mr. Ralph Upson, chief engineer of the Aircraft Development Company and inventor of the Upson metalclad airship, when interviewed on the disaster by AUTOMOTIVE INDUSTRIES, is indicative of the view held by authorities on lighter-than-air craft. Continuing, Mr. Upson said:

"It is up to the government to make adequate appropriations and to the industry generally to get started as quickly as possible on new lighter-than-air craft designs and developments. Until designs have proved satisfactory, it is advisable to curtail the development of special dirigible mooring masts and hangars as it is my opinion that airships of the future will be of vastly different design, and among the chief changes will be a reduction in the ratio of the total length to extreme diameter, in which the ratio will be in the neighborhood of 3 or 3½ to 1. The length of the Shenandoah was nearly nine times that of its maximum diameter."

Storm of Unusual Character

Reviewing the accidents which have befallen dirigibles in various countries, it is believed that the natural conditions which brought about the wreck of the Shenandoah have never before been encountered by an airship and it is doubtful if another ship would be called upon ever to withstand such a severe test. When one recalls the manner in which the Shenandoah battled its way back to its hangar in the teeth of a gale during January, 1924, after having been torn away from its mooring mast by the

storm and otherwise severely crippled, the structural strength of the airship was demonstrated as being capable of outriding any storm of the ordinarily severe type.

From whatever angle the situation be viewed, the direct cause of the disaster was structural failure of the airship itself, brought about by unusual violence of a storm of the kind known as a line squall. It is generally accepted that if any other dirigible either of present or past designs—and probably any type of airplane so far as that goes—had allowed itself to be caught in the center of the storm which destroyed the Shenandoah, it too would have met with a similar fate. In the case of the dirigible caught in a storm of this kind, it must be remembered that there is always a chance of the human beings on board being saved (approximately two-thirds of the Shenandoah crew were spared), while in the case of an aeroplane accident under identical conditions, it is doubtful if anyone could have been saved unless they were prepared with parachutes. Even then the chances would be slim.

From an engineering viewpoint, the crash demonstrates the necessity of building an airship which is capable of outweathering any form of storm, just as the modern liners and warships are designed to be unsinkable from any form of attack by the elements or ocean. According to latest reports the accident may have been caused by the quick expansion of the helium due to sudden rise in altitude setting up stresses among the longitudinal girders which, added to the severe bending movement stresses, broke the ship apart. Should this be a possible cause of the disaster, relief valves of greater capacity, offering quicker and more effective passage for the gases might have saved the situation. Another possible cause may have been the direct collapsing of the framework due to bending strains set up by exterior static conditions and the unusual angles the ship was thrown into during the storm. Until the official board of inquiry has announced its findings it is difficult to arrive at the exact cause of the accident, but a few factors which might have contributed to the collapse of the airship either directly or indirectly may be surmised; assuming that the powerplants were working perfectly.

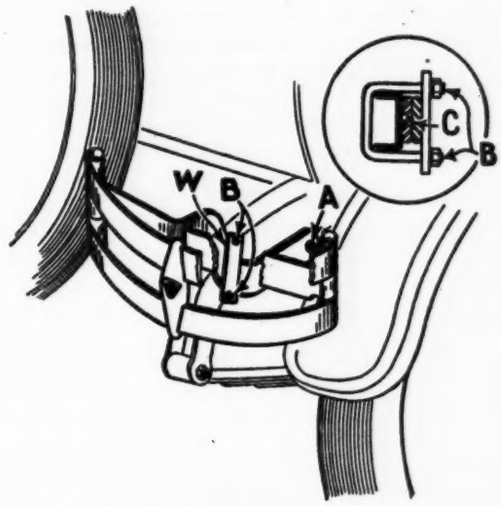
1. General unwillingness of the crew to valve helium on account of the limited supply of this non-inflammable gas.
2. Insufficient reserve lift. Altitude range limited with helium.
3. Range of varying gas pressures also very restricted.
4. Safety valve capacity inadequate.
5. Excessive strains set up among the longitudinal girders by extreme length of framework causing bending movements to occur when gusts of different velocity strike the fore and aft sections of the airship simultaneously.
6. Inefficient controls. Because of their manual operation and the time absorbed by the operators to correct conditions (in order to restore ship to its normal line of flight), the time elapsed perhaps allowed the ship to get into precarious position.
7. Structural factor of safety low, stated to be 2 to 1.
8. Method of attaching control cars and power plant cars inadequate to withstand strains when airship is thrown into various steep angles.
9. A lack of ground meteorological stations.
10. Possibility of fabric tearing off fins or hull.

Under military conditions the airship might have been compelled to go through the storm in order to reach its objective, but when operating as a civil ship carrying passengers and freight it would be advisable to go out of the way of the storm to the extent of even one hundred miles in order to avoid any possible danger of encountering a severe aerial disturbance. Again, under civil operation, the airship would have constant contact with meteorological stations, which would have sent out advance warning of an approaching storm. In the case of the Shenandoah, there was no meteorological station in the vicinity of the airship to warn it of the storm, with the result that the intensity or the violence of the disturbance was not discovered until too late.

As in any other development of a new mode of transportation, it may still take a number of years before an airship will be built that will withstand any weather, and it will be necessary to explore around the accident and aim to find the direct cause of the failure. When this has been determined and the changes are incorporated in future airships, the dirigible should be as suitable for transporting passengers and freight over any distances in excess of 1,000 miles. Finally, it should be remembered that even to this day several steamships have left port never to be heard of again, thus showing that there are natural phenomena which endeavor to defeat man in his efforts to conquer the various modes of transportation.

A Special Rear Fender Guard

A SPECIAL rear fender guard designed for easy attachment to the new Ajax automobile has been developed by the American Chain Co. This guard is installed by placing the fender against the automobile frame so that the hole in the fender arm rests over the rivet as shown in insert *C* in the accompanying illustration.



Method of attaching new fender guard to Ajax cars

A hook bolt goes over the lower frame flange and through the fender guard at *A*. The nut is not tightened on this bolt until after plate *W* has fastened the guard to the frame by means of the U-bolt shown at *B*. The illustration shows the assembly of the right guard; the left guard is fitted in the same manner.

A NEW test for materials for aircraft has been devised in England; it is based upon the "crippling load" and takes the place of the "proof" test which has been in use heretofore for the acceptance of structural steel strip. The proof test specifies a certain minimum deformation resulting from the application of a proof tensile stress, but the validity of the criterion has been questioned. In the new test the strip is partly subdivided into three strips by rows of perforating holes; the strip is then placed in a machine which pulls the two outer portions in one direction and the inner strip in the opposite direction. Buckling is then produced in the intermediary sections, and this buckling is said to correspond to the stress condition to which the strip would be exposed in aircraft.

Motor Industry the Busiest in England, Says Sir Henry Maybury

Public is riding more, drinking less, declares Director General of British Roads on visit to U. S. Makes study of traffic here.

By R. L. Cusick

ACCORDING to Sir Henry Maybury, Director General of Roads of Great Britain and Chairman of the London Traffic Committee, who came to the United States several weeks ago for a study of American road and traffic conditions, there is only one industry in all of England at the present time that is "on its feet." That is the automotive industry.

The great steel, coal, textile and shipping interests of the nation are virtually bankrupt, Sir Henry says. Unemployment has been growing steadily, with a million and a half workers now idle. Yet the automobile factories are showing every sign of prosperity and some of them are using night shifts to keep abreast of orders.

What factors are responsible for this parodoxical situation? One of the most interesting, in the opinion of Sir Henry, and also one of the most important, is the determination of the Englishman to own an automobile at the cost of suppressing his appetite for alcoholic drink.

Riding Instead of Drinking

"The lure of the automobile is becoming so great that our people are imposing prohibition on themselves in order that they may own a car," he declared. "It costs a great deal more to drink in England now than it did before the war on account of the high tax which has been placed on beer, ale, and liquors. The income of the average man is not large and if drinking were carried on as extensively as before the war it would be impossible for many people to buy and operate an automobile.

"Choosing between the drinking habit and the automobile, most of those who can afford one, but not both, are deciding in favor of the car. Thus we find the man with a family spending his holidays on the road as a tourist, instead of squandering his surplus earnings in the public houses as formerly."

Most of the cars sold to buyers of this class are the small 7-10 hp. type, Sir Henry says. The reason for this, of course, is that motor taxes are computed on the basis of horsepower, the rate being about £1 per horsepower.

Road and traffic problems in England, he said, are different from those in America, although from his studies in this country he discerned much that might advantageously be adapted to the conditions with which he has to contend. "Your system of traffic lights in the large cities is excellent," he said. "I was particularly impressed with the traffic towers in New York. However, I doubt whether such towers would prove very valuable in London. There our trunk streets are winding and comparatively narrow. Our cross streets are not laid out at regular intervals, as yours are, and many of them are not really cross streets at all. They are what one might call feeder streets. By that I mean that they open out into the main thoroughfares and there terminate. It thus becomes a question of distributing the traffic which they produce in streets which already are heavily burdened.

"In London we do not have as many motor vehicles as you have in New York, but we have a larger percentage of slow moving units. Instead of 600 buses we have 6000. More horse-drawn vehicles are used.

"During my survey in New York I applied a test which I had worked out for the measurement of traffic movement in London. Repeated tests had shown that in the main thoroughfares of London the traffic flow was at the rate of 10.1 miles per hour. In New York I found it to be 13.5 miles per hour, or nearly 3 miles faster.

"Roads in the United States, I think, are as a whole better than we have at the present time in England. But you must remember that yours is a much wealthier country.

"You must also take into consideration the fact that for five years, during the progress of the war, our roads were

necessarily neglected. Construction and maintenance practically ceased except in the case of roads used for the transport of military supplies. At the start of the war my forces were combed for men available for military service. In a short time I had only a skeleton of my normal organization. As the war preceded our expenditures were cut more and more, until toward the end we actually were depending upon voluntary women workers to keep the highways clean.

"Then there came a time when I was asked to take that part of my organization which was left and embark for France. There we recruited thousands of men and built up a small army of road builders for the purpose of keeping open the lines of communication to the front.

Sir Henry Maybury photographed in a characteristic pose while studying traffic conditions in the United States. The picture on the opposite page shows a congestion in Herald Square, New York City, which was one of the congested points visited by Sir Henry

Photo by Underwood & Underwood.

"After the war, when we returned to England, we found our roads in bad condition. We have made some progress since then, of course, but we still have a long campaign ahead of us to overcome the deterioration and delayed construction resulting from the war."

The financing of road construction in Great Britain, Sir Henry said, is handled something like this: A municipality agrees on an improvement program. The program may be general in nature, involving new roads, sewers, bridges, etc. When the plans are ready the municipality notifies Sir Henry's department and an inspecting engineer is sent out to examine them.

If the plans are approved a date is set for a "public inquiry," at which time the inspecting engineer sits as an informal court before which any citizen of the community may appear to ask questions or present arguments for or against the project. In case no serious objections are advanced the program receives a final O.K. and the municipal authorities are then empowered to borrow on it the funds necessary for execution. The loan is made through bankers, as a rule, and is secured by taxes.

Government Aid

This loan corresponds to a bond issue in America. If the roads to be constructed or improved are primary or Class A roads, the Imperial Government contributes 50 per cent of the cost. This is reduced to 25 per cent in the case of Class B roads. All Government road funds are derived from motor taxes.

Sir Henry's picture of London is a city riding in buses. "Buses are so numerous that they constitute perhaps our most serious traffic problem," he said. "No other form of transportation is so popular. We have a splendid subway system, probably better in some respects than the fine New York tubes, but the people won't use them. In New York I have marveled at the subway 'rushes,' hundreds of people jamming into the stations and fighting for standing room in the trains. We don't see so much of that sort of thing over there.

"We have tried to get more of the traffic underground, but without much success. Unlike the New Yorker, the Londoner does not take to tube travel. He would rather take a little longer to complete his journey back and forth to work and ride in the open. Hence the popularity of the buses.

"Last year tubes and suburban railways in London carried, roughly, 557,000,000 passengers. The buses carried about 1,343,000,000. You can see the difference.

"As a convenience for pedestrians and to relieve congestion at street crossings we have built a number of underground passages under the thoroughfares, but these are rarely used. People prefer to use the surface crossings.

Let the Public Decide

"In matters like this we find that it is generally wise to refrain from attempting to enforce conditions which are counter to the public will. Rather than oppose public opinion, we try to follow it; because, after all, the public will make its own rules. We try to give everybody as much freedom in traffic regulation as possible."

Sir Henry described the general business outlook in England as far from bright. Industry is overburdened with taxes. These taxes represent an "overhead" which at the start sadly handicaps the British manufacturer who would compete with the other nations of the world for foreign business. Consequently, Great Britain has lost most of the great markets which she controlled before the war.

"We harbor no ill feeling against the United States because she is collecting her war debt," he said. "We fully

Road chiefs of United States and Great Britain, Thomas H. MacDonald, head of the U. S. Bureau of Public Roads, and Sir Henry Maybury inspecting road testing machinery at a Government experimental station near Arlington, Va.

Photo by Underwood & Underwood

realize that credit is the keystone on which all world commerce and international relationship are built and we are determined that our credit shall be protected, regardless of the price. We voluntarily arranged a settlement of our debt to the United States. Our burden is so hard to bear because thus far we have not been able to collect the debts which France, Italy and Belgium owe us. It should be understood that we did not borrow from the United States primarily for our own needs, but for these countries which now refuse to pay us. Their credit was so impaired that they could not borrow in America. We therefore stepped in and pledged our credit for them.

Whole Cities Are Idle

"We now have hundreds of factories of every description, and whole cities, in fact, idle. Over a million idle workers are dependent on the local authorities for support. The funds which are used for this purpose are derived from taxation. We are compelled to tax heavily those who are working in order to support those who are idle. Our income taxes would seem confiscatory to a person in the United States. A man in England with an income of $10,000 a year pays about $3,500 of it to the Government.

"What the final solution of our economic problems will be no one can say. But I feel that it will be many years before our prosperity is fully restored."

Sir Henry is a vigorous, middle aged man, a fluent conversationalist and a recognized authority on road and traffic conditions. He numbers among his friends many American highway experts and automotive men, some of whom he has entertained officially in London. He is a Salopian by birth. Upon leaving school he entered the office of the chief engineer of the London & North Western & Great Western Joint Railways, remaining there for five years.

He then joined a firm of public works contractors and subsequently became manager. In that capacity he had charge of large railway, road, sewer, gas and waterworks contracts. In 1892 he was appointed engineer, surveyor and general manager to the Festiniog Local Board, having charge of all departments, including gas and water. In 1895 he was appointed to a similar position under the Malvern Urban District Council, having charge of gas, water, quarries, sewers and, subsequently, the electric light undertakings.

In 1904 Sir Henry became county surveyor of Kent and continued in that office until 1913, when he was appointed chief engineer of the Road Board, and later manager and secretary of the board. During the time he was in Kent he took a very active interest in the development of modern highway construction and was responsible for the building of several trial sections of road at Sidcup which proved of great value to other road engineers in Great Britain.

Under the Ministry of Transport Act of 1919, the Road Board of Great Britain was absorbed by the Ministry of Transport and Sir Henry was appointed to his present office of Director General of Roads, in charge of the Roads Department of the Ministry. He is a member of the English Institution of Civil Engineers, an honorary member of the Institute of Gas Engineers, an honorary member of the Institute of Municipal and County Engineers, and a Fellow of the Royal Sanitary Institute. He is also a past president of the Institute of Transport and a vice-president of the British "Safety First" Society, of which the Duke of York is president.

Sir Henry has been confining his study in the United States to the cities of New York, Newark, N. J., Washington, D. C., Boston, Detroit and Chicago. He expects to return to London in a few weeks, having been in this country since Aug. 23.

CIRCULAR No. 214 of the Bureau of Standards contains new Government master specifications for medium and light rust preventives, or what is often referred to as slushing grease and slushing oil. The specifications cover Material and Workmanship, General Requirements, Methods of Inspection and Tests, and Additional Information. Copies of the Circular can be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.

Carbureter Combines Advantages of Air Valve and Plain Tube Types

Simplicity of construction and low cost are features of new Rayfield design introduced by Beneke Mfg. Co. as the Model K.

THE Beneke Manufacturing Company, Chicago, is now in production on what is known as the Model K Rayfield carbureter, designed to meet the requirements of a high-class job without losing sight of the demand for low cost and simplicity of construction. The principal parts of this carbureter are about the same as those of other standard makes, and by certain combinations of old principles a new design has been created. The object in view in the design was to combine the advantages of both the air valve and the plain tube types.

From the accompanying cross-sectional view, which is diagrammatic and shows only the important parts, it will be noted that there is an idling by-pass *A* directly off the main jet *B*. The venturi *C* functions practically the same as in the plain tube carbureter in combination with an air valve which actuates a pump for acceleration. The air valve also functions as a compensator between the low and intermediate ranges.

Part Is Independent

From the layout of the carbureter it will be seen that the part which furnishes the proper proportion of fuel and air for fixed or steady throttle openings is entirely independent of the accelerating mechanism. The dash pot *D* does not act as a check to the air valve, but operates a pump which in turn injects an extra amount of fuel into the main air stream during the period of acceleration. It does not deliver any fuel when the air valve is at rest in any position.

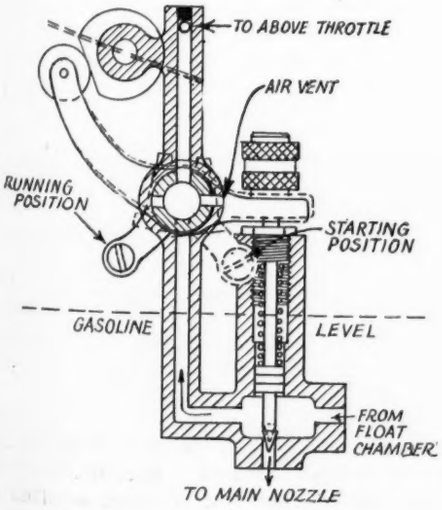
In fitting the carbureter to different engines, the venturi diameter, air valve diameter, spring tension, cam lift, main gasoline nozzle size and injection nozzle size are altered as required. The carbureters when leaving the factory have parts of standard dimensions. Nozzles are furnished in steps of 1/32 in. diameter, air valves the same, and the cams are stamped in 1/1000 of an inch lift, the nozzles are in drill sizes and the springs are marked 2, 4, 6, and 8 points light or heavy.

Cam on Throttle Shaft

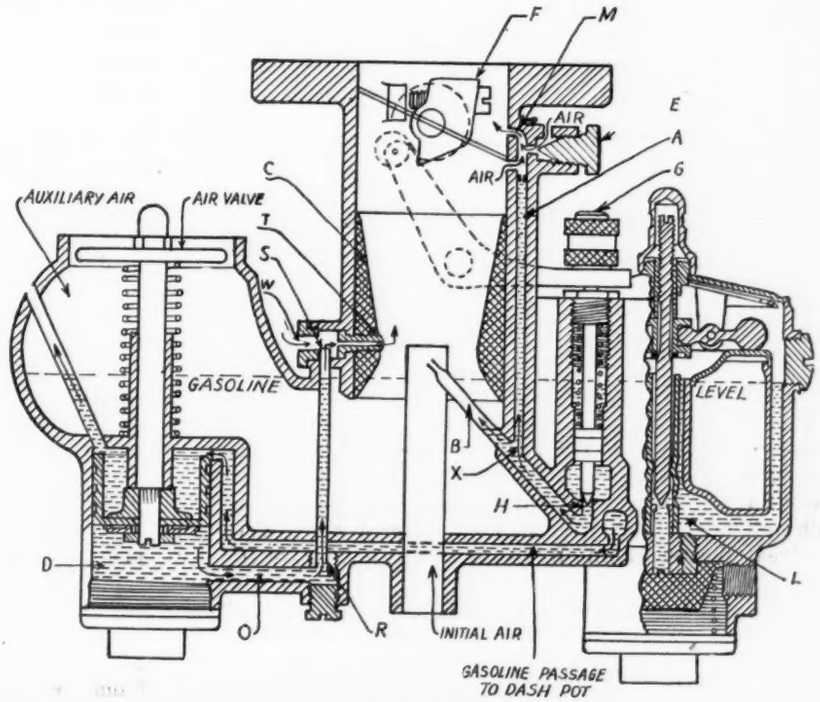
The cam is fixed on the throttle shaft and its position relative to the throttle valve need never be changed. This does not mean, however, that the cam cannot be replaced with one of more or less lift in accordance with the requirements of the engine.

In the illustration will be noted two holes, one marked *M* and the other located directly below it. The top hole is the idling jet and the bottom hole acts as an auxiliary nozzle. When the throttle is opened slightly, more fuel is drawn through the idling passage during the period when the main jet is coming into action. The drop in pressure in the main air passage or at the tip of the main nozzle gradually draws the fuel up in the main gasoline passage and the latter starts to deliver into the air stream at the point where the idling jet is delivering its maximum flow.

The dash pot piston is fitted to the check valve, which allows for a quick action return of the air valve to its normal position, but when pushed down by the action of the air on the valve it becomes a pump forcing gasoline



Rayfield starting primer



Rayfield Model K carbureter

through the passage *O* to the nozzle *R*, whence it is finally drawn into the air stream inside the carbureter body. The delivery nozzle *T* is very small in proportion to the air vent *W*, hence no gasoline is drawn out of the delivery tube except when it is elevated by the pumping action.

The principle of construction of a starting primer is made clear by the smaller cross sectional view. The scheme is substantially the same as that used in previous Rayfield carbureters, that is, a single control operates both the primer for starting and the needle valve for warming up. When the control is pulled all the way out it opens the valve which allows gasoline to by-pass directly from the float chamber, but when it is pushed partly in it closes the valve and the remainder of the travel is used to control the main needle valve so that more fuel is allowed to flow by the needle for warming up purposes.

Seifert Convertible Seat

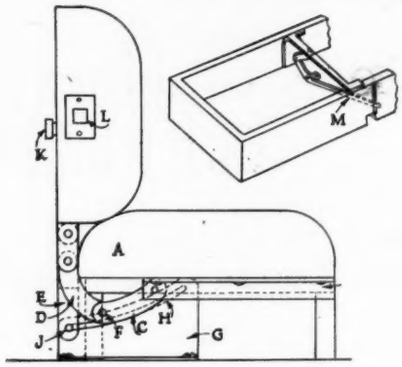
THE construction of seats which may be "made down" into beds for sleeping purposes has been featured by several builders of standard closed cars during the past few years. Another such system was designed and patented recently by Henry Seifert, 7035 Greenview Avenue, Chicago.

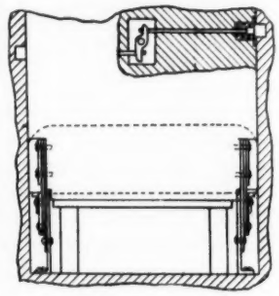
The Seifert design is such that it can be applied to a single front seat or to the folding chair type of seat commonly furnished in large closed cars. In the latter case it is therefore possible to make the rear compartment of the car into a sleeping compartment.

The general layout is shown in the cross sectional views, in which *A* represents lugs supporting the front edge of the seat. Extending along each side of the seat is a bar *B* and pivotally connected to the inner end of each bar are the curved links *C* the outer end of which is connected to *D*. Parallel bars *E* extend down the back of the seat, and the end of the link *D* opposite its connection at *F* with the link *C* is connected to the bar *E* at each side of the seat back.

Below the seat and on each side is an angular plate *G* the vertical flange of which has a slot *H* cut into it for the pin *J* to ride in. These two guides determine the position of the seat when it is folded back.

In the back of the seat is a knob *K* which actuates a spring catch *L* on each side of the seat. The catches normally engage in recesses cut into the pillar for the doors of the car, or wherever they may be conveniently placed. Whenever it is desired to lower the seat backs it is only necessary to release the catches with the knob and drop the backs, during which process the pins *J*, traveling in the slots, move the links *C* and *D* toward each other.





Sectional view of the Seifert convertible seat, showing the general layout of the brackets and sliding members

The rear seat of the car is loosely mounted in order that it may be raised or lowered to provide a pillow-like structure. Adjustment of this is accomplished by a lever *M* placed in the seat riser. Lowering the lever raises the seat.

A COURSE dealing with the fundamentals that underlie the construction and operation of Diesel and oil engines is being offered at the Brooklyn Polytechnic Institute, the instructor being J. Kuttner, a graduate of Massachusetts Institute of Technology, who has had practical experience in Diesel engine factories and in the operation of such engines at sea. Special emphasis will be laid in the course on operation and maintenance, but since it is felt that a knowledge of how and why a given type of engine came into being is serviceable to the operating engineer, these matters will be treated in detail.

Seifert convertible seat for automobiles, showing how the back of the front seat is lowered to bring it in alignment with the rear seat cushion. The support for the rear seat cushion also is tipped slightly forward to form a pillow-like structure

$10,000 Airplane Engine Depreciates $10.60 Per Hour of Service

Estimate is based on 800-hour life. Average engine good for 400 to 800 hours of active use, or total of 44,000 to 88,000 miles of flying. Cost of repairs and overhauls calculated.

By Archibald Black
Consulting Air Transport Engineer

AMONG the elements entering into any calculation of air transport operating costs, the question of engine maintenance and depreciation must, necessarily, be given very careful attention.

Due to the very high grade of workmanship and materials involved in their manufacture and to the, as yet, very limited production, the initial cost of these engines is very high. Spread over the life of the engine this initial cost assumes considerable importance in any operating cost analysis. It becomes essential that the information on which such analysis is based be compiled with the greatest of care if the ultimate result is to be of any value.

While air transport is a very new activity it has been in existence long enough to provide some definite information on maintenance costs. It is so seldom, however, that information of this kind is given out for publication that some figures should be of interest.

There is nothing to be gained by going to Europe for data on airplane engine maintenance costs. Operating conditions, engines, labor and material costs are all different from those in the United States. This was proved by the writer and his associates a few years ago when they first became interested in air transportation possibilities. Later, when the occasion for preparation of some operating cost analyses actually arose, it was only logical that attention should have been turned to American airplane operators and engine repair shops for the data.

Methods Used in Calculations

Practices governing overhauls were noted; labor time and parts replacements charges compared. Through consultation with those engaged in regular rebuilding of high grade engines on a more strictly commercial basis, comparative costs were also obtained. Business-like methods of allowing for depreciation had to be developed on account of the general tendency of operators of airplanes to pass lightly over this question.

The data herein represent the results of these studies and have been constantly modified to meet slightly changed conditions since first compiled. Consequently, the figures and practices recommended can be regarded as applicable to conditions of airplane engine maintenance in the United States at this time.

All calculations of the cost of operating airplane engines begin with the cost of the engine on account of the necessity of distributing this cost over the "useful life" of the engine. This term "useful life" is placed between quotation marks largely because of memories of lively discussions which took place between the writer and that most capable airline operator, Col. Frank Searles.

Col. Searles, for whom we have the greatest respect despite some differences of opinion, waxed a little ironical over the method of bookkeeping which gave an aircraft engine a definite "useful life." If memory serves correctly, he was unkind enough to ask if we proposed to hold any kind of ceremony at the end of this period. Whereupon he was promptly informed that we did! We proposed to pull the engine apart, when its condition warranted, cancel its serial number and place all usable parts back in stock for the maintenance of other engines.

A Matter of Bookkeeping

After all, the whole question of "useful life" of an airplane engine is largely a matter of bookkeeping. The net result will be the same no matter what system is used. If the engine is generally worn out, it will be withdrawn from service and usable parts salvaged and it matters not at all whether we call the period in service its "useful life" or anything else that fancy dictates.

The "useful life" of an airplane engine, as judged from our present experience, ranges from 400 to 800 hours of active use. The tendency is for this period to constantly increase as later types of engines are brought out and some engine builders already are almost willing to promise 1000 hours of useful life.

If regrinding of cylinders, and possibly crankshaft and some other bearings, is to be allowed for, the 1000 hour average life begins to look quite a reasonable expectation. However, it is not yet advisable to base any operating cost estimates on this figure. For general use, apart from losses of engines due to accidents, a 400 to 500 hour life may be assumed if no regrinding is to be done. If, on the other hand, the cylinders and some of the bearings are to be reground it will be safe to count upon obtaining an average useful life of 800 hours in the air.

At first impression these figures may seem low in comparison with the service obtained from other types of vehicles. However, if the comparison is placed upon the proper basis of mileage, a very different aspect is seen. Thus assuming only a modest average air speed of, say, 110 miles per hour, the airplane engine gives a total mileage of 44,000 to 88,000 with 110,000 looming as a possibility.

If the average passenger automobile is assumed to be driven 7500 miles per year, the airplane engine may be considered as giving the same service as an automobile which can be maintained in first class running condition for 6 to 12 years with a prospect of giving 15 years of good service.

From such a comparison it will be clear that the present airplane engine renders excellent service.

To reduce the initial cost of engines to actual figures, we may take the Liberty-12 as one example. Engines of this type can be purchased from the Air Service for about $2,000, f.o.b. the point of storage. However, as these engines are of the vintage of 1918, their design is somewhat out of date. To a very large extent this can be rectified and the old Liberty brought up to date by a general overhaul and the replacement of several obsolete parts such as timing gears, certain bearings, etc., and the remodelling of the old oil pump and cylinders.

Liberty Engines Cost $3,000

For preliminary estimate purposes, it is safe to figure Liberty-12 engines bought from the Government, overhauled, remodelled and delivered as costing a total of $3,000 each. Modern engines of 600 to 800 horsepower will cost from $10,000 each upwards. The exact price will depend upon the maker, type and quantity, but the price stated is sufficiently accurate for use in the absence of any other quotations.

These initial costs (less the salvage value of the retired engine) must be converted into costs per hour by distribution over the average useful life of the engine. In this form they represent one element of engine maintenance cost.

The salvage value of an airplane engine which has reached the end of its useful life is an element upon which probably no operator has been able to place a satisfactorily definite value. The figure represents the actual value, at the time, of such parts of the withdrawn engine as are capable of being made to render further service, plus the scrap value of the remainder of the engine. The value of the salvaged parts is determined by deducting from their original cost the expenditure necessary to place them in condition for further service and also such allowance as may be necessary to adjust their past and possible future service. The final result of these adjustments will represent the salvage value of the engine.

Using the experience of large operators as a guide, the following parts may be regarded as typical of those which can usually be salvaged when a Liberty-12 engine is withdrawn from service after 400 hours or more of use: Crankcase; at least two or three cylinders; connecting rods; cam shaft assembly; cam shaft drive; some gears; some thrust bearings; water pump; oil pump; manifolds; carbureter; a large proportion of the electrical system and a number of small parts.

No Regrinding Done Here

It should be noted here that American operators as yet do no regrinding of engine cylinders or crankshafts but this is on account of the availability of a supply of these parts. In compiling estimates for a commercial airline the engines will probably be figured on the basis of the 800 hour life and regrinding of cylinders (and perhaps also crankshaft) assumed. In such cases the salvage of most parts would ordinarily be much reduced but this will be largely counterbalanced by the adoption of more modern engines and by increasing the attention given to salvage.

On the 400 hour life basis the salvage value of parts may be taken at 20 per cent and on the 800 hour life basis at 15 per cent of the cost of a new engine. Using this as a basis and assuming regrinding, the depreciation cost per hour of an airplane engine with an 800 hour life may be taken as 85 per cent of its original cost divided by 800.

Thus, if the engine cost $10,000, this depreciation charge would become $10.60 per hour of operation in actual use.

In allowing for the value of engines lost in total wrecks, or "washouts" as they are termed by operators, the number of such wrecks to be expected should first be determined, based upon Air Mail experience. The information obtained from the records may be directly applied, assuming the wrecks to carry directly with the mileage flown, unless operating conditions are greatly different. Detailed studies showed that the engine has a shorter life than the rate at which "washouts" are to be expected under average operating conditions. Consequently the average engine which is lost in a wreck will have had a considerable proportion of its estimated "useful life" already written off against its original cost. The assumption may be made that the engine lost in the average wreck has passed the middle of its life at least.

In the ordinary course of events, as previously mentioned, the value of salvaged parts of engines withdrawn from service would be about 15 per cent or 20 per cent of the original cost of the engine, depending upon the life basis used. In "washouts" some engines will represent a total loss excepting for the very small scrap value. Others will be in such condition that the entire engine can be salvaged.

Value of Salvaged Parts

The assumption may be made, with reasonable safety, that the value of the salvaged parts in the average "washout" is about 20 to 25 per cent of the original cost of the engine. Thus the net loss in these cases will average about 50 per cent or less of the life of the engine, or about 40 per cent of its original value after allowing for salvage.

It must be remembered that the foregoing method of calculating the monetary value of engine losses involves some assumptions which should really be varied with operating conditions, etc. However, some values must be fixed for preliminary estimate purposes and the above figures and method are probably as accurate as any which can be devised as yet.

The cost of overhauling engines is an element which can be worked out with very reasonable accuracy. The practice of most American operators is to put every engine through the shop for a complete overhaul after each 100 hours in actual use.

150 Hours Without Overhauls

As a matter of fact, modern engines can be satisfactorily operated up to 150 hours between overhauls, particularly if they are given a minor or "top overhaul" once between the regular overhauls. It is therefore safe to assume complete overhauls after every 100 hours of flying time without allowance for other than minor adjustments between these general overhauls.

For an engine such as the Liberty-12, these overhauls, including a short block test, will involve about 182 hours of labor as based upon American operators experience. We obtained check estimates from several commercial shops, all of which ran below this time and some of which ranged as low as 120 hours per engine, depending upon the volume of work. However, it is advisable to use the higher figure of 182 man-hours as being the most reliable and insuring that any error will be on the liberal side. This figure may be assumed to be practically unaffected by the size of the engine if between 400 and 800 horsepower and of the conventional twelve cylinder type.

The parts which require replacement in each of the overhauls will naturally increase with each succeeding overhaul. Experience with Liberty-12 engines and allowing about 400 hours or more of flying life, shows an average parts replacement charge of about $200 per overhaul. This cost is based upon the purchase price of the repair parts today and may be assumed to vary in accordance

with the cost of new engines, the Liberty-12 being assumed to cost $3,000 for this purpose.

No allowance has been made for regrinding of cylinders or bearings in the above figures. If this practice is to be adopted, the life of the engine may be figured at 800 hours, but a regrinding charge must be included in the overhaul which takes place after the first 400 or 500 hours in flight. Estimates were obtained from Parker Motor Rebuilding Co. on regrinding costs and to these were added some allowances for the replacement of all (instead of part) of the pistons, rings, etc. This study indicated that the additional cost over that of the ordinary overhaul would range from about $370 for Liberty-12 engines up to about $450 for the larger modern engines.

Cost of Shifting Engines

In addition to the direct cost of engine overhauls, the cost of removing the engine from the airplane and its replacement with another engine must be reckoned as forming part of the engine maintenance charge. The amount of the material involved in this changing of an engine is small, but it would be advisable to allow about $10 to cover it in operating cost estimates.

Assuming adequate handling equipment to facilitate the removal and replacement of engines, the labor can be considered as varying from 10 to 25 man-hours for the two complete operations, including also a short running test before turning back into service. These figures, however, are subject to very considerable fluctuation according to the design of the airplane and the facility with which the engine can be removed.

A NEW type of Gammeter valve for lighter-than-air craft has been developed by J. R. Gammeter of the B. F. Goodrich Rubber Co. to supplant the older type of the same valve. The new valve is said to be more sensitive and has a discharge capacity of 10,000 cu. ft. p. m. Friction is reduced to a minimum through the use of ball bearings at the pivot points and by having the center beam ride in rockers. The valve is constructed chiefly of aluminum alloy.

Chrysler Brake Test Stand

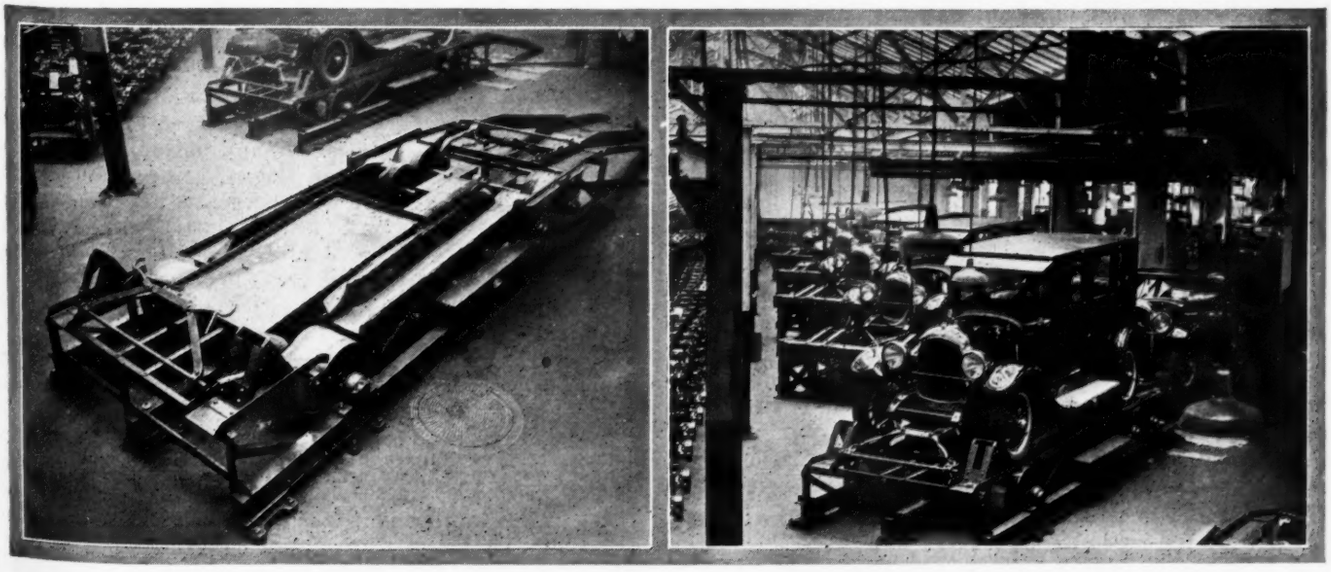
IN the course of the final testing program, all Chrysler cars are placed on brake testing stands. Here the cars are run under their own power for the equivalent of three miles on the road at a speed approaching 30 m.p.h. at times. The hydraulic brakes are set up during the earlier portion of the run in order to insure even band contact at all four wheels. High spots are worn in and the braking action is made uniform all around. If necessary, additional fluid is introduced to the hydraulic system by means of the auxiliary tank at the dash. In the latter stages of the test braking action is tested at various speeds, being checked by an inspector who examines all four wheels while another man operates the car from the driver's seat.

As illustrated, the test stand is built up largely from structural steel stock. An inclined runway or approach is located adjacent to the main aisle of the final test room. At the top of this incline the path for the approaching car is determined by flanged steel members and leads over the two pairs of rear rolls. The front wheels are guided by flanged members and buffers into position over the front pair of rolls. Steel bumpers at the front prevent the car from over-running the stand. As the car is driven into position, the grabhooks shown are applied to the front spring horns and another pair of hooks is applied to the rear end, being drawn taut by a toggle linkage. A section of flexible hose is slipped over the muffler tail pipe and in turn is permanently attached to a pipe coming up through the floor. This pipe connects with an exhaust system for the entire bank of test stands.

Axles for the rear pairs of rolls are interconnected by sprockets and silent chain which are inclosed in a light steel housing. A wide belt runs over pulleys on the front shaft of the rear pair and the drum shaft for the front wheels. The rear wheels are cradled by the two drums on each side while the front wheels are carried on the tops of the drums. A running board at the side facilitates entrance to the car.

This device is the invention of C. H. Fennell, plant engineer at the Chrysler factory.

Apparatus Used by Chrysler in Four-Wheel Brake Tests



Fennell Testing Machine. Several are in use at Chrysler Plant for seating and checking hydraulic four-wheel brakes. Various units are inspected during the run

A SHOWROOM always tidy, with well arranged stock and displays, has its effect on the public. All good business men keep their establishments clean and attractive as a matter of routine, but an extra effort should be put forth once or twice a year; there is always room for improvement.

Pass the Word Down to the Dealer—*It's "Slick-Up" Time!*

Factory executives can perform valuable service by furnishing ideas as to attractive window displays, arrangement of stock and methods of tidying up the shop.

By Clyde Jennings

A "SLICK-UP" campaign is quite necessary occasionally to keep up with the times. So many things get to be routine that a busy man, unless he makes a distinct effort, is quite likely to let them become matters of course. Just as certain as he does, overhead accumulates and he gets behind the times.

The manager of a Western electric light company hired a personal assistant some time ago as a publicity man. The man he hired was a top notch newspaper reporter, and so when he reported for duty and was informed that he was to take his time and find out what the business was all about, he was not surprised. He put in a busy two weeks and then came back to the president to find what his real duties were.

"Your publicity work," the president said, "concerns me alone. I am your sole audience and you will supply me with publicity on all the things I ought to know that you think I don't know. Now get busy and find something to tell me."

Six months later a rather nice offer to return to newspaper work came to the publicity man and he decided that here was a chance to check up on himself. So he told the president about it and finished with, "I am interested in this job and like it, but you may not be as happy. Now is a chance for me to get out if you want me to."

He did not leave. The reason was that he had proved himself very valuable by suggestions and by catching things that had slipped into routine. A revision of the mailing list that he had suggested saved the company his salary each month by properly taking off dead names.

One reason for his usefulness was that everybody in the company except himself was very busy on regular duties and did not have time to muss around and ask questions. He was the "Slick Up" man and he was always on the job.

Referring to a light company reminds me that in the very question of light there is need of an occasional "Slick Up." House, store and shop lighting is one of the progressive arts. There are almost monthly steps in advance. And strange to say, there are few lighting experts about the country, so a man must keep up with the progress of his own accord. There are few salesmen about to keep him posted on these developments.

Take the matter of globes or bulbs. Books have been written about these and the use and economy of the various kinds. There is a world of difference between the effects of different bulbs and the reflectors and shades that go with them.

Sight is the first sense employed in buying and, consequently, should be the first step toward a sale. When a new model car is introduced, much attention should be given to the staging of the exhibition in every city. Because of the scarcity of lighting experts and window dressers, it might be well for the factories to give some study to this plan. But that is another story. This one is about "Slick Up."

Novelties in lighting change from season to season. During the last few years there have been the spot lights for display; interior lighting of closed cars, and the colored shades to supply interesting and varied effects. All of these vogues have their use in making attractive displays and live dealers like to use them. There should be more suggestions of this sort passed on to them from their sales headquarters.

It is interesting to know that theatrical leaders like Ziegfeld, Erlanger and Belasco study lighting closely, and most of the developments are adaptable to automobile show room displays in some form. In the theater, of course, the sight impression is extremely important, and when a new show is in contemplation these masters of stagecraft spend days and days in the laboratories of the great lighting companies, like those at Nela Park for the G. E. C. and Harrison, N. J., for the Edison.

It is there the effects are worked out and it is from these laboratories that the very excellent business room lighting firms get the plans that they promote through specially designed lighting fixtures.

When the lighting effect is improved, the next thing is the merchandise. People get tired of looking at the same side view of the car. Why not roll them around daily? Many merchants have adopted the practice of changing the position of the cars each morning and evening, even if the same cars remain on the floor.

Viewed from Wrong Angle

There is one salesroom where the front car on display always stands at an angle but so that only a side view can be seen from the sidewalk. This particular car is often praised for its front and rear end appearance, but these positions are never shown in this salesroom.

One man who has been prominent in the automotive industry for many years first attracted attention to himself by arranging a broken show window glass attraction—you know, where it appears that the car had run through the glass. The fact that he rose rapidly in the sales end of the business proved that this was not an isolated idea.

Then, too, some dealers have an idea that they must not doll up the cars and show accessories that are really suitable to the cars. Fortunately this idea is dying, but it is being succeeded in some places by an idea that dealers should put on the cars the accessories which mean the most money to them, instead of those that are suitable for the car. There is a lot of missionary work factories can do in this connection.

Every dealer should check up on his display and be sure that he is not exhausting the patience of the people who do him the favor of looking at his windows.

Anyone who will stand on Automobile Row night after night will soon learn that a lot of window shopping that is to mean sales later on is done at night. Just stand in the shadow and listen. People come and go all evening. Some of these people have in mind the purchase of a new car and they are looking at these cars in their supposedly best display to decide which pleases them the most. It is well known that people who know the least about cars have the most decided likes and dislikes, and what could this come from except looks?

Shop as well as show room check up often yields interesting results. A dealer put a car on the shop floor to save storage charge. His stock clerk did not like the car where it was because it cut off his view of the shop. So he set about getting it removed. He pulled it out one day and counted the steps on the direct path from the end of the benches to the stock window. Then counted them with the car where the dealer had placed it. Each man required 20 additional steps to and from the stock window to get around the car. The stock clerk then counted the trips per day to the window and computed the wasted time.

The result was amazing. The dealer ordered the car removed at once and gave the stock clerk a lot of additional duties in keeping with his love for constructive details. The raise in pay loomed pretty large for the stock clerk, but it was only one-half of what the extra steps caused by this car had cost.

A Gold Mine for Emil

Another dealer, because there was ample space in the shop, permitted the men to toss a lot of junk in one corner. Of course there came a day when he ordered this shoveled out, but Emil, the slow but sure mechanic, objected. He said that when he got hold of an obsolete model car and they had no parts for it in stock, he could always fumble about in this pile and find something that would do. Emil's objection was overcome by permitting him to salvage anything he wanted. The parts he salvaged went into a special division of the stock room and carried a nominal inventory of several hundred dollars. But better than that, Emil was appointed to look over the junk being discarded every day, and he proved that he had a considerable ingenuity in solving a lot of troublesome problems.

The writer recently asked the executive head of a very aggressive organization what big job he tackled when he came back from his vacation. This is it:

"Always before Sept. 1 each year I make an inventory of the entire personnel of the company, and as the vacation season works itself out and business picks up in the fall I act on this inventory. It is a good season to hunt jobs, so I think it is the best time to let out the people who do not fit.

"Some slow movers need to be speeded up. Some bad numbers need to be transferred to more suitable work. Some need an extended vacation for physical repairs, and before the 'pep' up work for the fall begins we make these adjustments. We do not have a personnel department but we use a more or less formal rating system just the same. We check each of them on health, appearance, initiative, personality and loyalty. Then comes knowledge of our line and firm and finally fitness for the work they are in.

"When we get through with this job, we know who is to be promoted during the season."

A Personnel Inventory

The idea of a merchandise inventory is usual, but it is much less usual to find a man or a firm who makes a personnel inventory at stated intervals to avoid, as much as possible, breaking up an organization once it is set for the season. Perhaps it might appear that the fall is not the proper time for an automotive merchant to do these things, but there is this point in its favor: most automotive merchant establishments are reduced as much as possible during the winter months and such an inventory will help to decide which of the force are worth carrying over.

One point the head of an organization should never overlook is this: The firm that makes a name for itself for unreasonable discharges does not get the pick of the help available. A firm known for erratic discharges of sales and office help must pay dearly in getting new employees. A firm that takes care of its people builds a friendly relation with help applicants.

Another all too unusual inventory is that of the mailing list. Direct mail advertising has become very common practice. The objective of this mail campaign is, of course, to get the person receiving the mail to come and

see the car. In other words, the letter is the preliminary to the sight we have been discussing.

If this reasoning is correct, a lot of this mail is a dead waste, because it is going to people who are blind, so far as the possibility of seeing a car is concerned. It seems that once a merchant buys a "good" list, that serves for all time. The writer has recently seen mail efforts that cost perhaps 50 cents each that were mailed to a four year old list.

Few dealers have ever stopped to figure the cost of mailing to dead names. They will quickly reject an offer to sell them an up-to-date list of registrations for $100, say, and then go on spending $25 or much more a month uselessly on an old list. Direct mail runs into money almost as fast as permitting mechanics to draw oil without a requisition.

Cleaning Up the Benches

And then there is the shop floor and the benches. A "slick up" of the benches has been known to pay for itself in the matter of tools and small parts salvaged. The floor is the horror of most mechanics. There is no reason to believe that any mechanic really likes to get down and get under a car on a floor that is caked with oil and grime. Even if there is such a mechanic, it is unfair to the dealer and the shop to permit him to do so.

A mechanic recently was telling of the dozen or more shops that he had worked in and his highest praise for working conditions was for one shop. The strong point he made about this shop was that every Saturday at 11.30 the porter brought out a scrubbing machine and a supply of Oakite from the parts cleaning vats and started actually scrubbing that floor.

It was the custom in that shop for every mechanic, when he completed the job he had in hand at noon, to join the scrubbing squad. This man said that he never heard a mechanic object, even if he had to stay overtime to do his part. Mechanics took hold of the squeegees and mops and worked right through until the job was well done. Instead of objecting to working at porter work under orders of the porter, they took pride in having the job well done.

Profit-Building Ideas

So we suggest that there is really a profit in an occasional "Slick Up" and there are at hand guides for checking up on the job.

If a dealer is in doubt as to the appearance of his salesroom, let him ask some woman of good taste.

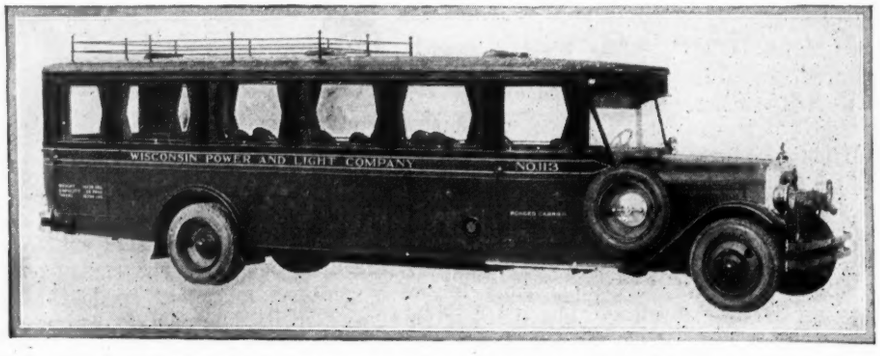
If he is in doubt about the quality of his lighting, let him get the light man to come into the salesroom and shop with a foot candle meter.

If he is not sure of his mailing list, let him send out one installment under first class postage with a request not to forward but to return to sender.

A self-contented dealer in a large city was greatly disturbed by some remarks about the appearance of his store by a friend. He could not believe that they were true and to prove that they were not true, he made a walking tour of the two motor rows of that city and stopped in front of each store in daylight and also at night, making notes on the good and bad points of each.

After completing this task, he made an appearance inventory of his own place and gave himself the third lowest grade of the lot. His store did not deserve quite such a low grade, but his effort resulted in an entire rearrangement, new decorations and a general overhauling. Also, an increased business.

Yellow Coach Parlor Car for Interurban Service



New Yellow Coach, parlor car type, for interurban service

A NEW coach built specially for interurban operation is announced by the Yellow Coach Mfg. Co. of Chicago and is designated the Type Y 25-29 passenger parlor coach. It has an overall length of body of 22 ft. 5 in., an overall width of body of 88 in., the same extreme width over the dual tires; an overall height under full load of 95 in.; headroom inside the body of 66 in.; a floor height from the ground of 23 in., and a height of the step from the ground of 14½ in.

Second growth ash is the material used for the body frame work, the posts being of ash capped with mahogany. The seats are wicker chairs of the de luxe type, with arm rests and divided backs, accommodating two passengers each. Cushions, backs and arm rests are covered with Spanish leather. There is said to be generous space between the seats and ample aisle room. Interior illumination is provided by ten 21 c.p. opal glass dome lights. The body is built by the Yellow Coach factory and is specially designed for the chassis.

I. D. BECK, 901 Irving Park Boulevard, Chicago, makes a solder for aluminum which is self-fluxing and which he claims to be unaffected by atmospheric influences. Before the parts are soldered the surfaces to which the solder is to be applied is thoroughly cleaned and the tin is applied to the heated surface by means of a fine brass wire brush. After the parts have been soldered together they are allowed to cool in air. For crankcases and other heavy parts the XX grade of Transco brazing solder is used, which flows at 470 deg. Fahr., as compared with 355 deg. for the X grade.

Just Among Ourselves

Final Volume of Automotive Engineering Series Due

WE venture to predict unusual interest in *Fuels and Carbureters*, the fourth and final volume of the series of engineering handbooks on "The Gasoline Automobile," by P. M. Heldt, which is about to come off the press. The first three volumes of this series appeared originally in serial form in the columns of *The Horseless Age* and were later published in book form, but this fourth volume has not been preceded by serial publication and therefore will have the advantage of a greater degree of freshness. The new volume will cover in twenty chapters not only the conventional fuel (gasoline), and the design and servicing of carbureters, but will deal also with other available fuels, such as kerosene, alcohol, benzol and various blends. It will review briefly the work which has been done in Europe since the war looking toward the synthetic production of alcohol and light hydro-carbons from coal and other plentiful sources of raw material. Other topics discussed include fuel tanks, feed systems and strainers, air cleaners, anti-detonants, combustion phenomena, exhaust gas analysis, etc.

Car Distribution Costs Not So High

THE expense of marketing automobiles has been criticised many times and by many people. Owners are frequently heard speculating about how much selling must cost and how that cost ought to be reduced. We've heard that idea expressed so often that we finally got to the point of belief. And now comes along an analysis of governmental and other figures by Niles & Niles, New York accountants, which shows that a smaller proportion of the consumers dollar goes to the distributors of automobiles than to the distributors of any other products except dental supplies. The analysis shows that the automobile producers get 73 per cent of the consumers dollar and the distributors 27 per cent. The proportion in coal is 0.444 for the producer and 0.556 for the distributor; in shoes, 0.552 for the producer and 0.448 for the distributor; in jewelry, 0.600 for the producer and 0.400 to the distributor. We can think of a lot of ifs and ands that would have to go with any detailed discussion of these figures, but we are just presenting them here as a matter of interest—and they are interesting.

Times Sales May Bear Watching

ONE of our New England correspondents, commenting on the times sales situation last week, remarked somewhat facetiously that "the finance men are finding a lot of people so busy with the lure of the outdoors that they have overlooked their payments and, consequently, some dealers are entering into a repossession season which is not looked upon with favor." This statement, linked with statistics indicating that among one group of New England dealers the percentage of used cars taken in trade this year is larger than last and the percentage of sales smaller for August, points to a condition which will bear careful watching if it becomes in any sense general. In the meantime, retail financing terms still are tending to become more liberal rather than more conservative in many sections.

England, Too, Has Traffic Troubles

ENGLAND is having its traffic troubles too. Statistics just compiled by the British National Safety First Association show that the number of accidents per 1000 vehicles has increased from 44.9 in 1918 to 51.3 in 1924. There were 22 vehicles per accident in 1918 and 20 vehicles per accident in 1924. It is stated by British authorities that the increase in the accident ratio is due partly to the fact that the police are reporting accident data more accurately than in the past and partly to the fact that the average number of miles covered each year per vehicle is higher than it used to be. Taking these facts into consideration the increase recorded is not particularly alarming, although the actual figures are sufficiently high to cause real concern.

American Light Car Research Active

PURCHASE of the Austin Company by General Motors marks the first definite step by an important American manufacturer toward getting into the light car field. Fairly well substantiated reports indicate that several manufacturers in this country are considering light car production, the term "light car" being used as meaning the small 7-12 horsepower jobs with narrow treads now common abroad. How soon any real action along this line will develop is hard to say. Some prominent American exporters don't think much of the light car idea even as an export proposition. Others are convinced that some such vehicle is needed by American makers if they are to maintain their present position of dominance in the foreign field.

N. G. S.

New Heavy-Duty Government Planes Carry Nine Passengers

Douglas C-1 Transports have maximum pay load capacity of 2500 lb. Powered with single Liberty motor. Speed 116 m.p.h. High in safety.

By Athel F. Denham

THE first two of an order of nine planes which are regarded as the latest word in heavy duty transports have been delivered to the Government by the Douglas Co., builders of the three cruisers which flew around the world last summer.

According to Donald W. Douglas the new planes, which are known as the Douglas C-1 Transports, and are an outgrowth of the world cruisers, represent a tremendous advance in aircraft design. The C-1 empty weighs 3800 lb., has a maximum cruising radius of 4500 miles when carrying a pay load of 1000 lb., and has a service ceiling of about 15,000 ft.

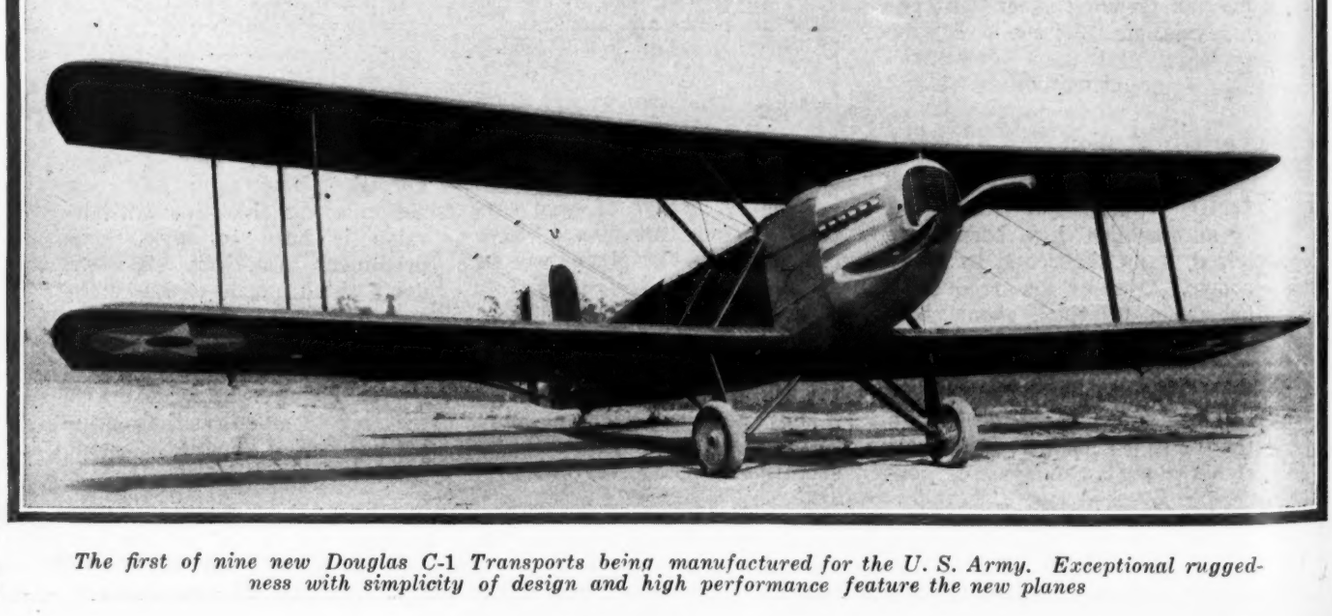
For normal intercity transport the maximum pay load of the plane is 2500 lb. when carrying cargo, and the normal pay load with nine passengers is 1720 lb., all with a single 400 hp. Liberty engine. The plane has a maximum speed of nearly 120 m.p.h. and a landing speed of 46 m.p.h., which figures are especially creditable in view of the fact that the chief considerations in the design were reliability, cruising radius and load-carrying performance.

The plane, built with the unusually high safety factor of seven, has a wing span of 60 ft., the wing area being 800 sq. ft. It has an overall length of 36 ft. and a height of 14 ft.

As much metal as possible has been used in the construction of the plane, while keeping in view the object of obtaining light weight with ruggedness. To this end the entire fuselage construction and about half of the remainder of the plane is of metal. While the wing ribs and spars are made of spruce, the spars being covered with 2-ply spruce veneer and the ribs being covered with 3-ply mahogany veneer, the internal brace rods are swaged steel rods anchored to duralumin fittings bolted to the spars. The external wing bracing consists of rolled steel streamlined rods and streamlined dural tube struts. The racking bracing is redundant in order that the transverse fuselage rods in the wing beam stations could be omitted to provide easy passage through the fuselage. Provision has been made for using folding wings, which would increase the weight only to the extent necessary to take care of the hinges, panels and extra fittings required. The wings consist of seven panels, two outer and one center upper section and two outer and two inner lower sections. The lower inner sections, which carry the main gas tanks and which have walkways built in, are detachable, together with the side of the chassis brace struts. As the gross weight with normal load of the plane is 6300 lb. and the weight with maximum pay load 7440, the wing load will vary from 7.9 to 9.3 lb. per sq. ft.

The construction of the tail surfaces is conventional, the fin and stabilizer being of spruce beams and ribs and the elevator and rudder of duralumin spars and spruce ribs. The stabilizer is adjustable in the air through the usual means of a hand wheel coupled to a worm and nut at the tail.

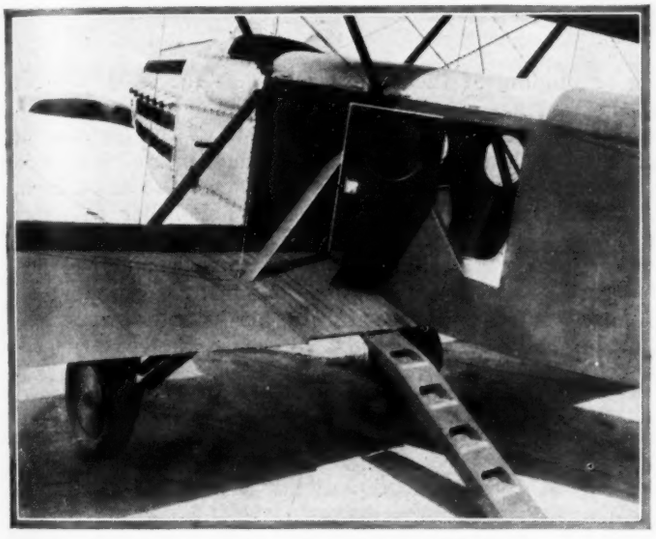
The landing gear is of the conventional divided axle wide tread type. The struts, which are of chrome molyb-



The first of nine new Douglas C-1 Transports being manufactured for the U. S. Army. Exceptional ruggedness with simplicity of design and high performance feature the new planes

denum steel, are streamlined tubes, the axle being of the same material; 36 x 8 in. straight side wire wheels are used, and rudder shock cord provides the absorbing means. The tail skid, which is also of chrome molybdenum tubing, is of the single member type and is connected with the pilot's foot bar to provide steering on the ground. The fuselage is constructed also of chrome molybdenum steel tubing and swaged steel tie rods, the joints being welded.

The engine section and pilot's bay back to the front wing spar are covered with a readily detachable aluminum cowl. The rest of the fuselage, except for doors, steps, etc., is fabric covered over spruce strips. The engine section, which carries the 400 hp. Liberty motor and a nose



Passenger compartment of the Douglas C-1. A maximum of eight passengers can be carried in addition to the two pilots. Seats are easily removed to provide for freight carrying

type radiator, forms also the pilot's cockpit, five bulkheads separating the sections, however. A single post and wheel type control is provided and the cockpit has been so designed as to facilitate changing places in the air of the two operators, side-by-side seats being provided.

The passenger or freight compartment has a clear cross sectional width of 46 in. and a height of 50 in., with a length of about 10 ft. Two doors in the sides and rear of the compartment are provided for easy access from the ground, the pilot's cockpit being reached through the passenger compartment. A door in the floor at the rear of the compartment permits of exit by parachute in the air, or to the ground in a crash. The six passenger seats are readily removable to permit using this compartment for freight.

The trussing of the lower longerons in the rear of the passenger compartment is so designed as to provide enough clearance for loading objects of such size as a Liberty engine into the fuselage. Two doors normally cover this hoist hole which may be folded up into the fuselage against the rear of the passenger compartment. Provisions for a hoist over the hoist hole and a T-rail for transferring heavy weights inside the fuselage have been made. Although only six seats for passengers are normally provided, together with a seat for the reserve pilot, capacity for carrying eight people in the present inclosed compartment is readily provided.

The planes as originally turned out were fitted with a 15 gal. gravity gasoline tank located in the center section of the upper wings and two 55 gal. main gasoline tanks, one in each lower wing section. For long distance flights three tanks, bringing the total fuel capacity to 1000 gal. of gasoline, can be placed in the fuselage. The oil tanks, which hold 12½ gal., are located in the engine section. All the tanks are made of aluminum.

The gasoline feed system is by means of an air driven pump directly to the carbureter, a hand gas pump being installed to pump to the gravity tank for starting or to keep the gravity tank full in the event of a failure of the engine driven pump. The cooling system consists of a cartridge core nose type radiator provided with shutters for temperature control.

According to Mr. Douglas, no plane has been built or is being designed at present in any country that can compare with the new Douglas Transport in both load carrying capacity and cruising radius. The planes cost the Government about $15,000 each.

Following is a summary of the major dimensions and performance of the new planes:

Wing span	60 feet
Overall length	36 feet
Overall height	14 feet
Wing area	800 sq. ft.
Total dead load (including furnishings and electrical)	3,900 lb.
125 gallons of gas	750 lb.
12½ gallons of oil	100 lb.
Crew of 7 passengers and pilot	1,450 lb.
Miscellaneous	100 lb.
Total useful load	2,400 lb.
Total normal pay load of 7 passengers	1,360 lb.
Total normal pay load of 9 passengers	1,720 lb.
Maximum pay load (cargo)	2,500 lb.
Gross weight normal load	6,300 lb.
Gross weight 9 passenger load	6,600 lb.
Gross weight maximum pay load	7,440 lb.

(This method of loading would vary the wing loading from 7.9 to 9.3 lb. per sq. ft.)

PERFORMANCE

Maximum speed	116 m.p.h.
Landing speed	46 m.p.h.
Service ceiling	14,850 feet
Absolute ceiling	17,500 feet

A NEW alloy of copper and aluminum known as Imita Gold has been placed on the market by the Imita Gold Corp., West Haven, Conn. It is claimed for this alloy that it has the color and luster of 18-carat gold and the strength of 40-point carbon steel. It is said to be unaffected by acids, alkalis and sea water and to be comparatively easy to machine.

According to the manufacturers, the electrical and heat conductivity are about 90 per cent that of pure copper. The weight per cubic inch is the same as cast iron. The tensile strength averages 76,000 lb. per sq. in. In elongation, elasticity and yield point the alloy is almost identical with 40-point carbon steel. The alloy can be cast, drawn, forged and welded.

It is also claimed for this alloy that it has excellent bearing properties and that its great mechanical strength adds to its value as a bearing metal in many cases. An added advantage is said to be that the process induces a natural lubricant into the metal and a bearing can be run dry for long periods without undue heating or burning out.

O. C. RHODE, who took a prominent part in the standardization work by which the present S. A.E. spark plug standard was evolved, calls attention to the fact that in some recent designs of engines not enough room is provided for the full length of spark plugs, so that there is danger of short circuits.

Changes in Timken Bearings Improve Design and Production

Longer life and ability to run more quietly at high speed are among advantages claimed for new processes. Nickel molybdenum steel substituted for chromium steel. Noise measured by radio.

By Herbert Chase

IMPORTANT changes in the design of Timken roller bearings have been effected by engineers of the Timken Roller Bearing Co. and practically the entire production of this concern now has been changed over to the new design.

Objectives which, it is asserted, have been realized as a result of the changes include longer life, ability to run more quietly at high speed and greater certainty of proper installation and adjustment.

As means to accomplishing these results not only has the design of the bearing been altered, but a superior grade of steel is employed and improved methods are used in certain of the manufacturing operations.

Design changes are illustrated by Figs. 1 and 2, which show respectively the older and newer type. It will be observed that the roll shown in Fig. 1 is beveled at the large end and that this bevel rests against a shoulder or flange formed integral with the cone. Note that the face of the shoulder is inclined outward from the central plane of the bearing. The roller makes line contact with the shoulder and is free to change its position with respect to the axis of the bearing except as it is restrained from so doing by the cage.

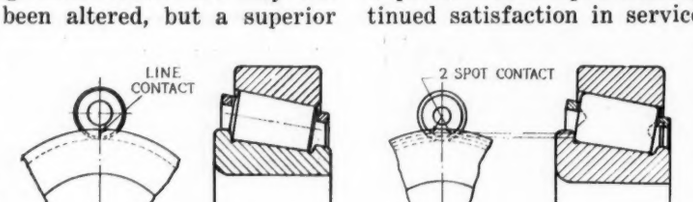


Fig. 1—Former design showing roll with beveled end which gives only line contact with shoulder and depends upon cage for holding roller in correct alignment. Fig. 2 shows new design with flat end roller making two-point contact with undercut shoulder. In this design the double contact results in a positive force tending to hold the rolls in correct alignment without regard to the cage

Since the cage necessarily is made with some clearance the rollers can skew slightly and produce a slight binding action or increased friction between inner and outer race. Furthermore, any inaccuracy in the alignment of the openings in the cage tends to throw the rollers out of their correct axial position and friction in one direction of motion often exceeds that in the other direction. In this design the flange of the cone does not exert any force tending to keep the rollers in correct axial position.

In the newer design, Fig. 2, the large end of the roller is machined flat and at right angles to the axis of the roller. This face bears against two points on the flange of the cone which is under-cut slightly, that is, inclined toward the central plane of the bearing. With this two-point contact there is always a force tending to hold the roller in its correct axial position without regard to the cage, which now simply performs the function of separating the rollers and holding them in a single assembly with the cone when the cup or outer race is removed. This positive (and patented) means of alignment is claimed to decrease friction, since it prevents any skewing or binding of the rollers, and thus increases the life of the bearing.

The other change in design consists of the addition of an inwardly turned flange on the small end of the cage. This flange tends to stiffen the cage structure and aids in preventing injury in case the cone-cage-roller assembly is dropped or otherwise abused.

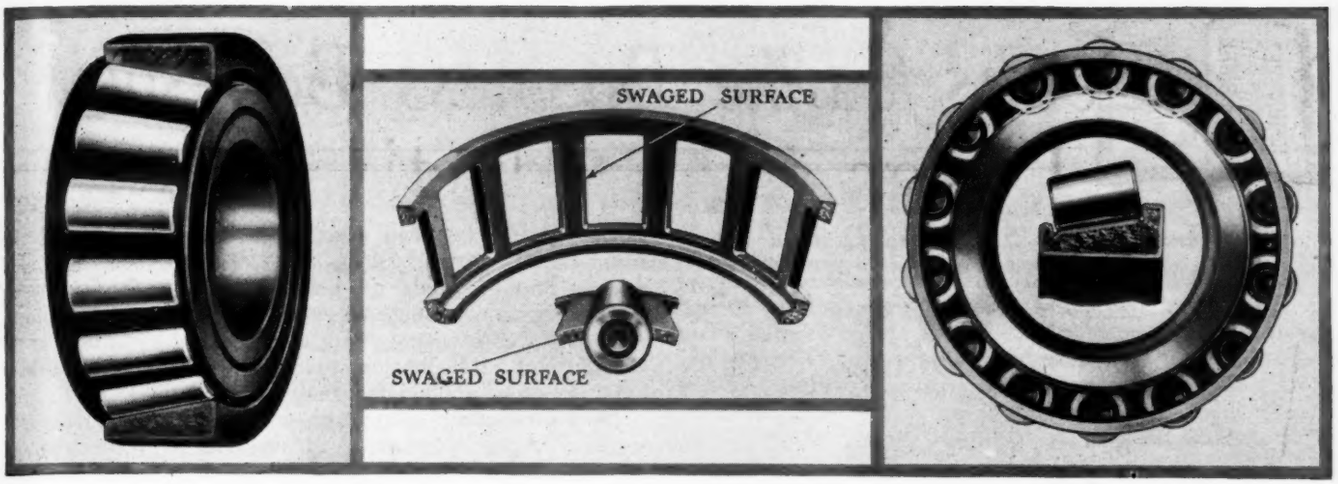
Other changes include the use of better material and improved production operations which, however, have an important effect upon bearing life and tend to insure continued satisfaction in service. Perhaps the most important of these is the substitution of nickel molybdenum steel in place of the chromium steel formerly employed. The old and new steel specifications are given in the accompanying table.

The advantage of nickel molybdenum steel over chromium steel lies not only in uniform heat treating results, but is said to give a finer grain structure, at least an equal if not greater resistance to wear, greater toughness and ability to withstand abuse, and freedom from segregation and non-metallic inclusions, which is an important factor as flaking or spalling off of the case is caused by the presence of slag filaments in the case.

Furthermore the new steel lends itself readily to case hardening. Thus it will be seen that a greater uniformity in production and an assurance of satisfactory service result from employing the new steel specification.

Another important item in connection with production is that termed multiple perforation of the cage. Formerly the openings in the cage were punched one at a time, as the cage was rotated by an indexing fixture. This progressive perforation resulted in slightly stretching the cage so that the last of the openings were not spaced exactly the same as those at the beginning of the operation and alignment of the openings was not as nearly perfect as desired. These difficulties now are minimized by the use of special dies which punch out all perforations in a single operation, the inwardly turned flange giving a rigid support, preserving cage contour.

This change not only assures the required uniformity, but permits of considerably more rapid production. A "winging" operation in which the sides of all the openings which contact with the conical surface of the roller are swaged follows the multiple perforation.



At left—Part section view of latest Timken bearing, showing cage and rolls in place. Center—Sections of cage used in latest Timken bearing, showing how the surfaces of all the ribs which contact with the rolls are swaged to conform to taper and curvature of the rolls. Right—End and sectional views of latest Timken roller bearing. Small dark triangles at top of cut show two-spot contact which rolls make with flange

In the case of bearings intended for comparatively high speed operation at points where quietness is essential, it has been found desirable to employ lapped rollers. Special Bethel Player machines are employed for the lapping operation. The rollers are lapped between pairs of cast iron plates which are given a rotary motion eccentric to each other, a lapping compound being applied. These rollers are noticeably smoother than those which are ground only, while the difference in noise made by the bearing is considerable, especially in the case of bearings used adjacent to the bevel pinion or other gear, running at relatively high speed.

One of the important items to be considered in any problem involving noise is the means for measuring the relative amount of noise produced. The Timken Company has developed a radio device expressly for this purpose. Its use not only permits of measuring noise but in so doing practically eliminates the human element.

Machine Has Vertical Spindle

The machine used has a vertical spindle to which the cone-roller-cage assembly is attached. The cup or outer race of the bearing rests in a recess on the table of the machine. The spindle is driven by a belt from a silent running motor mounted on the frame of the machine. The table has a hollow and comparatively light section which acts as a diaphragm.

Vibrations of this diaphragm caused by running the bearing are transmitted to the diaphragm of a telephone receiver by a light pin sliding in a bushing. An electro magnet in the receiver is connected to the primary of an iron core transformer, the secondary of which is connected in turn to the grid of a radio tube.

The oscillations in the secondary caused by the pulsating current set up in the primary of the transformer by the vibrations of the receiver diaphragm then are amplified by two other radio tubes and finally are led to a galvonometer which provides means for measurement on an arbitrary scale adopted for this purpose. This scale permits of grading the bearings in respect to their noise producing qualities. If the bearing makes more noise than that corresponding to a certain number on the scale, it is rejected for that class of work in which quietness is an important factor.

Ratings of the bearings have not been altered as a result of the design and production changes, but it is claimed that the quality of the product has been improved materially for reasons already given.

CHEMICAL SPECIFICATIONS OF STEEL USED IN TIMKEN ROLLER BEARINGS

Nickel Molybdenum Steel Used in Latest Type Bearing

	No. 4215	No. 4220
Carbon	.13- .18%	.19- .22%
Manganese	.40- .65%	.40- .65%
Nickel	1.50-2.00%	1.50-2.00%
Molybdenum	.20- .30%	.20- .30%
Phosphorous	.04% Max.	.04% Max.
Sulphur	.04% Max.	.04% Max.

Chromium Steel Formerly Employed

	No. 1118
Carbon	.12- .22%
Manganese	.35- .65%
Chrome	.40- .60%
Phosphorous	.045 Max.
Sulphur	.045 Max.

No. 4215 steel is used for cups and cones, and No. 4220 for rolls and heavy cones.•

Battery Charging Solutions Are Said to Be Ineffective

AN investigation recently made at the Bureau of Standards of certain solutions which were said to charge batteries instantly, or in a short time as compared with the usual process, showed that the claims were ill-founded. Analysis revealed that the solutions contain 38 to 42 per cent of sulphuric acid, which is about the amount as in the ordinary electrolyte of an automobile battery when charged. In some of them were found significant amounts of sodium or magnesium, as well as coloring matter. The sodium may have been added as lye, soda or Glauber salts; the magnesium, as Epsom salts.

The use of sodium sulphate (Glauber salts) in batteries is not new, having been suggested some thirty-five years ago, but various authorities since that time have stated that such material is without beneficial effect. This has been confirmed by the bureau's recent experiments.

Books for the Business Bookshelf

Future Petroleum Supply and Demand

PRESENT indications are that there will be no shortage of fuel for internal combustion engines during the next fifty years, or until science has developed other means of supplying energy from natural resources. This is the conclusion to be arrived at after reading "American Petroleum—Supply and Demand," a publication of McGraw-Hill Book Co., containing the report to the Board of Directors of the American Petroleum Institute of a committee appointed to make a study of the oil industry and resources of the United States.

Among the resources it was estimated that petroleum recoverable from existing wells by flowing and pumping is 5,300,000,000 bbls. After pumping and flowing there will remain about 26,000,000,000 bbls., part of which will be recoverable by flooding and similar processes when price justifies it; 25,000,000,000 bbls. of motor fuel are estimated to be recoverable from oil shale, 92,000,000,000 bbls. from coal, and 12,000,000,000 bbls. from lignite. In addition there are 1,100,000,000 acres of land where oil may be found when demand becomes strong enough to warrant thorough search, and improved methods of extraction and production will increase considerably the amount of gasoline obtainable from all crude oil supplies.

Demand for petroleum will depend to a large extent upon the number of automobiles in operation. For 1950 the total number of automotive engines is estimated at 45,000,000, and for 1975 at about 54,000,000. With no improvement in motor efficiencies and basing fuel consumption at 10.1 bbls., the average consumption per motor per year for the last seven years, fuel demand for 1950 is estimated at slightly over 450,000,000 bbls. and for 1975 just under 550,000,000 bbls. If, as many automotive authorities, such as H. L. Horning and C. F. Kettering claim, it is possible to double the efficiency of motor engines in so far as fuel consumption is concerned, then under these conditions the demand in 1950 would be about 230,000,000 bbls., or only about 10,000,000 bbls. more than the 1925 demand, while for 1975 about 275,000,000 bbls. would be sufficient.

Principles of Machine Design

THE subject of machine design is a very broad one and may be handled in a variety of ways. Books on this subject are used chiefly as texts in courses on mechanical engineering, and the tendency in this field in recent years has been not to overspecialize but to limit the instruction to the fundamentals on which design and engineering practice in general are based. Mechanical engineering embraces a great many different industries and the student at college generally does not know as yet which of these industries or branches of industry he will get into after graduation; if he has received a sound training in the fundamentals he is not likely to meet with much difficulty in picking up the details, the technique, of the business while actually engaged in it.

On the other hand, there is danger of making the subject too abstract so that the student has difficulty in seeing the connection between what he is being taught and the problems of every day life. This charge is often leveled against our methods of teaching mathematics. Much time is devoted to methods for the solution of equations, integrating differentials, etc., and after the student is all through his mathematical course he has no idea of how all this can be applied to practical work.

An intermediary course appears to have been followed by Prof. A. C. Norman in his volume on "Principles of Machine Design" recently issued by The Macmillan Co., New York, as one of their engineering science series. The fundamentals on which the design of each machine element must be based are explained, and numerous illustrations of their practical application are given. In many cases the derivation of the formula for calculating the strength of parts is omitted, as, owing to the great range of subjects covered, this would have required too much space, but copious references to reports on original investigations are given throughout the book.

After one chapter on Strength and Failure and another on Materials, the elements of power plants are taken up, separate chapters being devoted to such subjects as Boilers and Plate Vessels, Riveting and Welding, Cylinders and Cylinder Heads, Stuffing Boxes and Packings, etc. This is followed by a series of chapters on what may be regarded as elements of power transmission, such as Spur Gearing, Bevel Gearing, Friction Clutches, Shafting, etc. The work has a strong leaning toward automotive engineering, a large proportion of the problems discussed and illustrations shown being examples of automotive practice. Examples for the student to work out are given throughout the book.

City Traffic Problems

IN practically all cities of the country the problem of regulating and handling automobile traffic is very serious now and is becoming harder to solve successfully day by day. Although city authorities, automobile owners and the automotive industry in general realize the importance of its solution to the continued progress of municipalities and of automobile serviceability in the cities, and although much thought has been given toward means of remedying the present conditions, opinions are still greatly divided as to the proper method of attack.

This is the thought to be gained from "City Planning and Automobile Traffic Problems," by Alvan Macauley, and published by Packard Motor Car Co. This pamphlet contains an analysis and summary of replies to a questionnaire sent by Packard Motor Car Co. in cooperation with *Public Works* to city engineers and similar officials of cities of more than 10,000 population. Replies were received from 233 cities regarding their particular traffic problems, what they were doing toward their solution and what program for the future offered the best possibilities for eliminating traffic congestion. Included in the pamphlet are two reprints of articles by Mr. Macauley, one from *Public Works* and one from *Automotive Industries* on the need for intelligent city planning in order that the streets may be able to handle the constantly increasing number of automobiles.

New Pyrometer Makes 12 Records on One Chart

Operates on "frictionless" principle. Embodies novel features. Built by Brown Instrument Co., of Philadelphia.

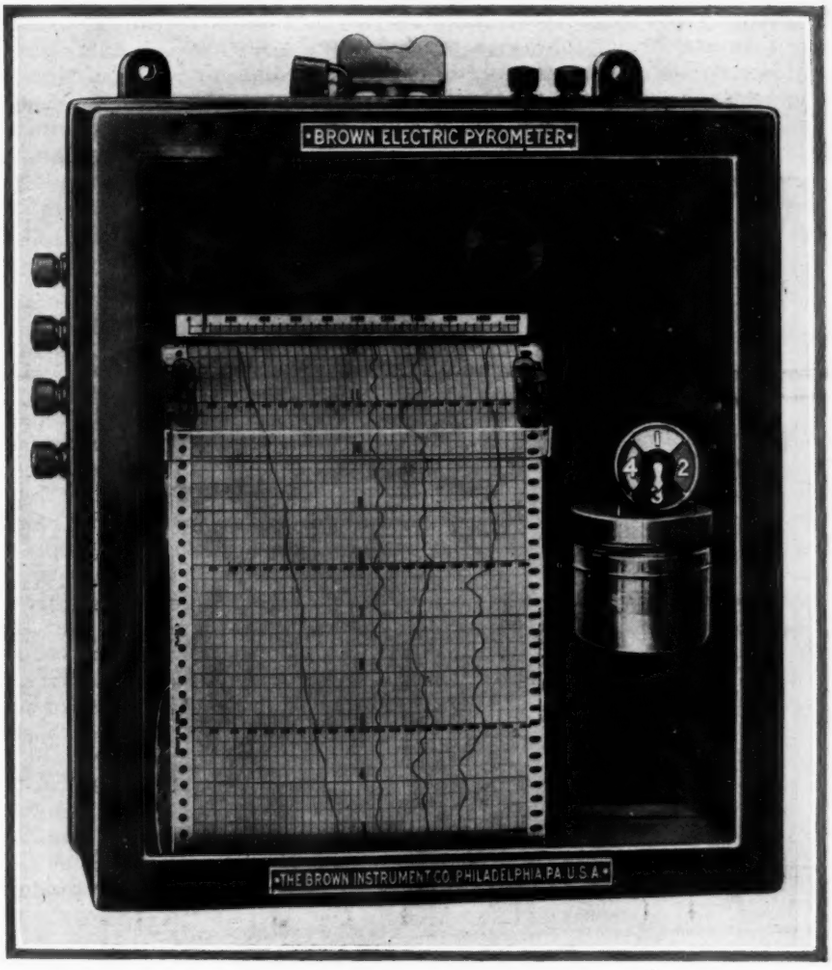
A NEW recording pyrometer has been developed by the Brown Instrument Co. of Philadelphia. It embodies some novel features on which patents have been applied for.

The recorder has a die cast, black enameled aluminum case and is 15 in. high, 14 in. wide and 9 in. deep, the width of the chart on which the records are made being 7 in.

The instrument is built to make either a single record, a duplex record (two records side by side) or, in multiple form, as many as 12 records on one chart. It operates on the "frictionless" principle, that is, the pointer swings freely and at intervals of 30 seconds is depressed on a carbon or inked ribbon, producing a mark on the chart. These marks are so close together as to form a continuous line. The marking ribbon and chart last two months before renewal is required, and no inking is necessary.

The marking ribbon is above the paper, so that the mark is produced on the front side of the paper where it shows clearly. In the single and duplex recorder the ribbon, after each mark on the chart, is moved back, disclosing the last impression so that the record is clearly visible immediately after it is produced. A platen is supplied on which notes can be recorded on the chart with pen or pencil.

A glass knife edge is furnished for tearing off the paper and is located directly below the driving roll. The paper can be torn off two hours after the last impression is made. For example, a complete record for the previous 24 hours and ending 6 a. m. can be torn off about 8 a. m.



New Brown recording pyrometer

The galvanometer with the recording chart mechanism is carried on a hinged frame. When swung aside, the galvanometer is instantly accessible, but is protected by a housing in the closed position.

In addition to recording the temperature on the chart, an indicating scale is provided with large figures legible at a considerable distance. The chart has rectangular coordinates. The time lines are straight across the chart instead of being curved.

If alternating current is available the recorder is driven by an electric clock which consumes six watts. This eliminates hand winding, and no governor is needed to secure accurate timing. Where alternating current is not available a hand-wound clock can be supplied.

The chart speed can readily be changed and is supplied for a number of combinations. The standard chart speed is one inch an hour but by reversing two gears a speed of four in. per hour is obtainable. Speed combinations are available from one-quarter in. an hour to six in. per hour. With a standard chart speed of one in. per hour, about 12 hours of chart is visible through the front of the case, as the illustration shows.

The instrument as a pyrometer incorporates automatic cold junction compensation, including the Brown patented index for adjusting a compensated pyrometer to the correct initial starting point on open circuit.

As a multiple recorder, this instrument incorporates an automatic switch with gold contacts mounted on bakelite and immersed in oil, which prevents tarnishing of the contacts by corrosive gases in the atmosphere.

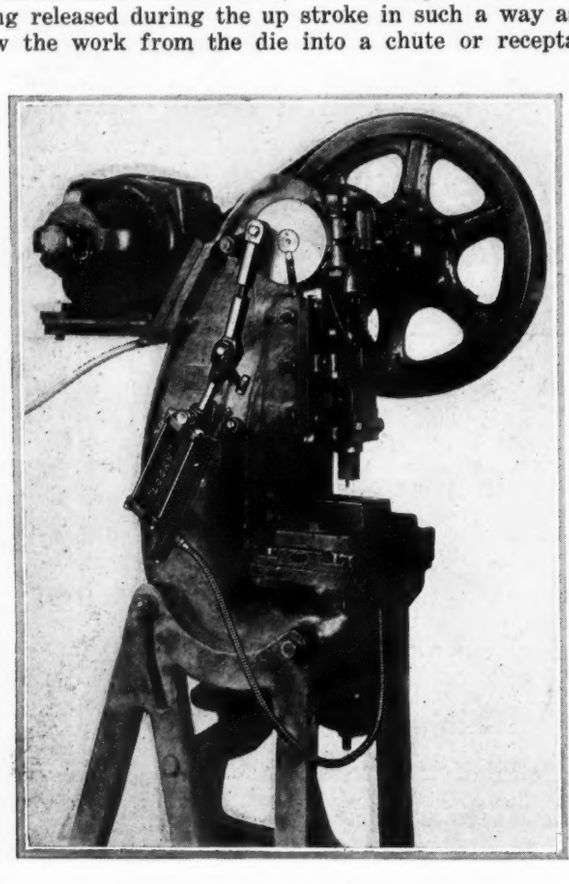
The multiple recorder switch includes a dial with index for indicating the number of the thermocouple or furnace which is being recorded at the time. The record lines are made in color combinations and the switch dial is numbered and colored to correspond.

A NEW type of belt for power transmission is being marketed by the Power Engineering Co. of Youngstown, Ohio. It is known as the Endural belt and consists of an endless alloy steel belt, claimed to be both stainless and rustless. The chief claims made for these belts is that they have an efficiency of over 99 per cent.

New Developments for the

Safety Device for Punch Presses

THE Logan work ejecting air compressor, manufactured by the Logansport Machine Co., Logansport, Ind., is an attachment for punch presses whereby during the down stroke of the ram, air is compressed, this air being released during the up stroke in such a way as to blow the work from the die into a chute or receptacle.



Logan work ejecting air compressor

This makes it unnecessary for the operator to place his hand between the ram and the die, thus eliminating the chief cause of accidents. It is further claimed that production is increased by blowing the work from the die, and that all foreign substances, such as scale and chips, are removed from the die, resulting in better work and eliminating a cause of injury to the die. The compressor is easily attached to any punch press or other type of machine.

Revere Uses Dual Steering System

IN the belief that steering gears on cars fitted with balloon tires have too low a gear ratio to enable the car to be operated with safety at fairly high speeds, the Revere Motors Co., Logansport, Ind., has fitted a steering gear to the new Model 25 which allows of two entirely independent gear ratios.

One steering wheel is placed above the other, the upper operating the steering mechanism at a reduction of 7 to 1 and the lower at 14 to 1. The lower wheel is geared from the direct steering gear and is said to check the rebound jolts. With this equipment, the company states the car can be handled very easily at slow speed, in parking, and also at high speeds.

The Model 25 Revere is fitted with a new type of roadster body and top of clever design. Aside from the new steering gear, the chassis is substantially the same as Revere has been making for some time. The bodies are largely custom built and wheel equipment also is optional.

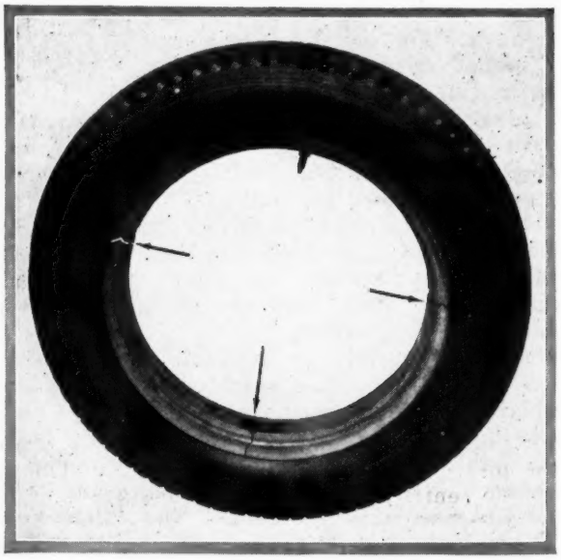
Collapsible Tire Rim

A COLLAPSIBLE tire rim which, the manufacturers claim, permits putting on or taking off a tire in 30 seconds, is being manufactured by the Audet Manufacturing Corp. of Williamsport, Pa.

The rim collapses inside the tire so that it can be removed or replaced without pulling the sides of the tire over the rim flange. In putting on the rim, the tire is held upright with the valve stem near the ground and the collapsed rim placed in position, as shown herewith. Then the collapsed sections are raised into position or the tire rolled over so that they fall into their proper place and by means of a simple cam are locked securely.

To remove the rim the cam lever is moved to throw the cam out of position, after which bouncing the tire a few times collapses the rim and permits it to be lifted out of the tire.

It is said that the joints always work freely when the rim is being collapsed and that locking the rim by means of the cam lever makes it just as solid as any single piece rim. Rims to fit nearly all makes and models of cars are now in production.



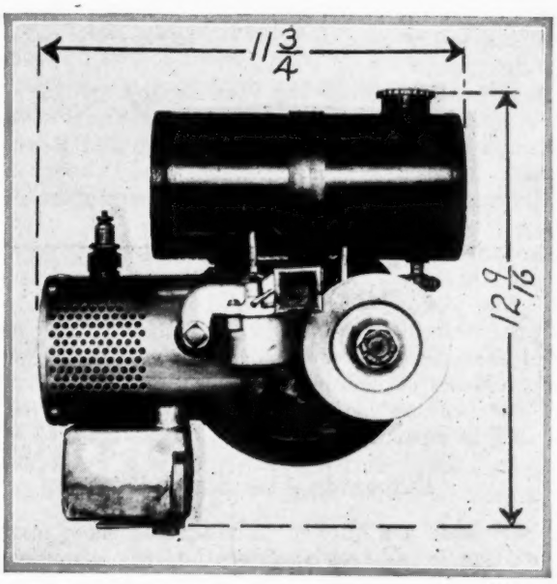
The Audet collapsible tire rim in place and locked. The rim is built in three pieces and thus has three joints as indicated by the arrows. The cam locking device is seen at the lower joint

Automotive Manufacturer

A Light-Weight Engine

THE accompanying illustration shows what is claimed to be the lightest small gasoline engine for power purposes ever put in production. Complete with gasoline tank, carbureter and muffler it weighs only 22½ lb. The only cast iron parts are the cylinder and the flywheel.

This engine, which is manufactured by the Cushman Motor Works, Lincoln, Neb., is of the two-stroke, high speed type. The crankshaft runs at 1800-2200 r.p.m. This crankshaft is unique in that both of the main bearings are on one side of the crank pin and the whole



Side view of Cushman single cylinder two-stroke 1-hp. engine with fuel tank, carbureter and muffler

crankshaft is case hardened, ground and polished to a hard, mirror-like surface. Gear teeth are milled into the crankshaft itself between the two main bearing bushings, which latter are of hard phospher bronze, properly oil grooved. Meshing with these crankshaft teeth is a bronze gear mounted on the hardened and ground jack shaft. The gear reduction is in the ratio of 12 to 47. The power is in most cases taken from this jack shaft, which runs at approximately 500 r.p.m.

For lubrication, oil is mixed with the gasoline, in the proportion of ¾ pint to a gallon. The mixture enters the crankcase through a third port from the carbureter. The vaporizing action of the carbureter, combined with the comparatively high temperature of the crankcase, vaporizes the gasoline. The oil in the form of a very fine mist, but not as a vapor, lubricates the cylinder walls, the piston, and the crank pin bearing. This oil is thrown by centrifugal force onto the surface of the crankcase and drains to the bottom, and then to one side through a channel which leads into the compartment in which the gear previously mentioned runs. This gear picks up the oil and carries it to the crankshaft pinion, which is located between the main bearing bushings. The teeth on the crankshaft are incomplete at both ends and extend into the bushing, forming channels through which the oil may enter the bearings.

The carbureter is unusual in that the gasoline enters the bowl through the same hole through which it leaves when sucked into the air passage. This hole is directly in the middle of the bowl, so that the engine may be operated on a 45 deg. angle without the level of the gasoline relative to the metering orifice being changed.

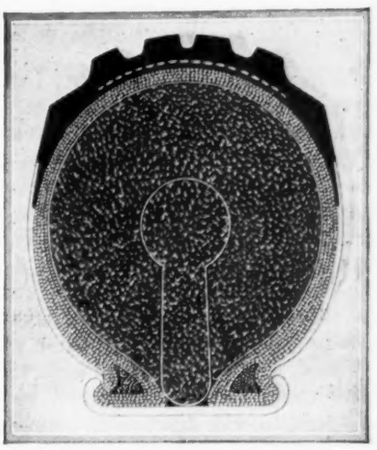
The cylinder is jacketed with sheet aluminum and the flywheel acts as a sirocco fan, which sucks air through holes on one side of the cylinder jacket, across the cooling fins of the cylinder and down to the center of the flywheel. Then the air is thrown outward by the revolution of the flywheel. Thus there is a constant draft of air across the cylinder at all times.

The engine is equipped with a simple governor. The bore is 2¼ and the stroke is 1 5/6 in. On test, the engine is said to have developed 25 per cent more than its rated output of 1 hp.

This engine is particularly suited for intermittant service such as running a lawn mower, a small cultivating machine, a washing machine, a cream separator, a small air compressor and other devices of like nature. Complete with gasoline tank, carbureter and muffler, the engine is only 12 in. wide, less than 12 in. long, and slightly more than 12 in. high. At present the ignition is by current from a dry cell battery, but a flywheel type of self-contained high tension magneto is being developed.

"Rubber Ace," Tire Filler

THE manufacturing rights to a new filler for pneumatic tires, known as Rubber Ace, have been purchased by the B. F. Goodrich Rubber Co. The news of the deal is rather significant, for the reason that heretofore manufacturers of pneumatic tires generally have held to the view that there could be no substitute for air in tires for road vehicles. It is understood, however, that Goodrich will, for the present at least, manufacture and recommend the filler for tires for commercial vehicles only. The filler is manufactured from rubber by injecting air into it and then curing the rubber and compressing it to casing form. The method was invented by a Chicago engineer about five years ago. Tests made by Goodrich engineers are said to have shown much that is of practical value, and the filler is thought to have a definite field of application on commercial vehicles as it affords approximately the same cushioning effect.



Section of pneumatic tire filled with Rubber Ace

Special Advertising Copy Written for Each Dealer Under New Chevrolet Plan

Effort made in all cases to fit campaign to local conditions. Small dealer gets benefit of having problems worked out by trained experts.

IF left to his own devices, the small-town automobile dealer can very easily make a botch of his advertising. He is seldom trained in the science of advertising and unless he happens to be especially gifted in that direction his efforts are apt to be weak and ineffective. The money spent for advertising is wasted, opportunities to increase sales are lost and the dealer's aggressiveness is shaken.

The Chevrolet Motor Co. is attempting to overcome these conditions by the new advertising plan announced briefly in the Aug. 27 issue of *Automotive Industries*.

Under the new system the needs of each individual dealer and the problems confronting him in his territory will be carefully analyzed by trained experts and an advertising campaign designed specially for each. Briefly the plan is as follows:

Dealers' Advertising Fund

The Chevrolet Motor Co. charges a small amount for each car shipped to dealers and credits this amount to the Chevrolet Dealers' Association advertising fund. To this fund the company adds a substantial amount from its own advertising budget and with the combined amount plans the dealer's advertising campaign, writes his copy, buys the newspaper space, purchases and prepares the art work, sends the advertisements direct to the newspapers, directs the printing and display of outdoor advertising, handles the invoices and pays the bill.

Because the above details will be handled by expert ad men who know their job, officials of the Chevrolet Motor Co. are optimistic as to the outcome of the plan.

The company in reality has become the advertising department of each of its dealers whom it provides with an efficient and consistent advertising campaign. It serves much the same as an advertising agency and gives them the service which under the old conditions they did not secure.

Local Idea Is Stressed

To quote J. E. Grimm, Jr., Chevrolet advertising manager, "it is local advertising nationally directed and should not be confused as national advertising used locally."

The cooperative feature of the plan does not apply in a financial way to the national advertising used by the company in the principal magazines. This advertising is paid for from the general advertising appropriation of the company without expense to its dealers, who will continue to receive gratis the sales literature and the window display service that have been furnished in the past. These displays supplement the unified advertising plan.

The dealer in subscribing to the plan is given a guarantee that every dollar which he pays into the fund will be spent in his district for newspaper or outdoor space, all of the costs of preparing and placing the advertising matter being covered by the company's contribution to the fund.

The plan has many desirable features, some of them being the following:

1. The copy is written by trained experts.
2. It gives the dealer organization the benefit of men skilled in advertising and merchandising problems and who can produce a higher grade of copy.
3. It gives the dealer more for his money.
4. It relieves the dealer of the responsibility of writing his own ads and of looking after the incidentals that arise in placing them.
5. It is possible under the plan to key the local and national advertising and thus broadcast a single advertising message at the same time in national and local publications.
6. It forces every dealer to do some consistent advertising.

Before any step is taken in the writing of copy, the dealer in whose territory the copy will be used is consulted. The various newspapers in his territory are reviewed, their circulation discussed and their pulling power analyzed as to the particular copy to be written. His particular problems of selling, whether they be economy or power, also are analyzed and the copy written with the appeal that is most desired.

Billboards Also Studied

The billboards are studied in much the same manner. Their location is the first consideration, the company seeing that the ads are placed in a position where they can be easily read. This is not an easy task, for certain billboards may be suited to one type of advertising and totally lacking in another appeal.

Throughout the selection of the media, whether it be newspaper, magazine or billboard, the one uppermost thought is to see that the advertisement is correctly placed and that the dealer gets the most for his money and that the advertising does what it is planned to do—to sell more cars for that particular dealer.

To carry out the plan and to insure its working to the best advantage the Campbell-Ewald Company, which serves Chevrolet as advertising agent, has sent from its own organization 14 field men who are located at strategic points throughout the country.

Duties of Field Men

These men, in addition to being advertising experts, are trained also in the merchandising of automobiles and the problems relating to them. It is their duty to make a special study of the territory in their charge and through personal conference with each of the dealers in the district to learn their problems as well.

The plan does not mean that the dealer cannot advertise on his own initiative. If he desires to use more space, that is up to him, and he will be assured of the full cooperation of the company and the ad expert in charge of his district.